



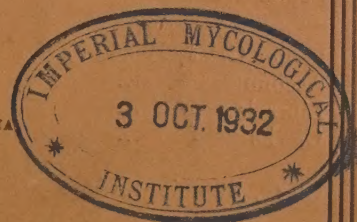
British Guiana.

ADMINISTRATION REPORT
OF THE
DIRECTOR OF AGRICULTURE
FOR THE YEAR
1931.

GEORGETOWN, DEMERARA

PRINTERS TO THE GOVERNMENT OF BRITISH GUIANA
"THE ARGOSY" COMPANY, LIMITED.

1932.



DEPARTMENT OF AGRICULTURE.

HEAD OFFICE.

Director of Agriculture	...	...	...Prof. the Hon. J. Sydney Dash, B.S.A. (McGill).
Deputy Director...	...	...	...F. Burnett, M.C., M.A. (Oxon.).

DISTRICT AGRICULTURAL SUPERINTENDENTS.

East Demerara	...	...	...E. M. Peterkin.
North West District	...	...	...E. Beckett, F.L.S.
Essequibo	...	...	...A. deK. Frampton, C.D.A.
West Demerara	...	...	...J. D. Gillespie, B.Sc. (Edin.).
Berbice	...	...	...H. Macluskie, U.D.A. (Aberdeen).
Essequibo (Assistant Agricultural Superintendent)	...	...	...A. A. Abraham.
Demerara (Assistant Agricultural Superintendent)	...	...	...H. D. Huggins, Dip. Agr. (I.C.T.A.).

RESEARCH—(LABORATORIES).

Entomologist (Seconded, Moth Borer Investigation)	...	...	...L. D. Cleare, F.L.S., F.E.S.
Supernumerary Entomologist	...	...	...F. A. Squire, B.Sc. (S.A.).
Botanist and Mycologist	...	...	...E. B. Martyn, B.A. (Oxon.).
Chemist-Ecologist	...	...	...R. R. Follett-Smith, B.Sc. (Lond.) A.R.C.S.
Assistant Chemist	...	...	...C. L. C. Bourne.

RESEARCH—(FIELD EXPERIMENT STATIONS).

Livestock Farm, Georgetown—			
(Veterinary Surgeon)	...	...	...T. Bone, O.B.E., M.R.C.V.S.
Experiment Station (Sugar), Sophia—			
(Cane Agronomist)	...	...	...C. H. B. Williams, Dip. Agr. (I.C.T.A.).
Experiment Station (Rice), Georgetown—			
(Plant Breeder)	...	...	...L. E. W. Codd, M.Sc. (S.A.).
Experiment Station, Cecilia, E.C., Demerara	...	...	...E. M. Peterkin.
Experiment Station, Hosororo, N.W.D.	...	...	...E. Beckett, F.L.S.
Experiment Station, Henrietta, Essequibo	...	...	} A. deK. Frampton, C.D.A.
Bush Lot Land Settlement Scheme	...	...	

BOTANIC GARDENS.

Superintendent in Charge	...	...	...E. B. Martyn, B.A. (Oxon.).
Horticultural Assistant	...	...	...H. A. Cole.

AGRICULTURAL INSTRUCTORS.

Resident Instructor, Berbice...	...	...	...E. M. Morgan.
Resident Instructor, East Demerara	...	...	...C. C. Dowding, F.L.S., F.R.H.S.
Resident Instructor, East Demerara	...	...	...D. D. Haynes.
Assistant Instructor, Essequibo Islands	...	...	...J. E. Wilson.

AGRICULTURAL ASSISTANTS.

Experiment Station, Georgetown	...	...	...J. Indrobeharry.
Experiment Station, Essequibo	...	...	...H. B. France.

LABORATORY ASSISTANTS.

Meteorological Observer	...	...	...D. D. Blackman.
Entomological Assistant	...	...	...C. Williams.
Botanical and Mycological Assistant	...	...	...N. Persaud.

RICE GRADING STAFF.

Grading Inspector	...	...	...E. G. A. Benson, B.Sc. (Lond.), Dip. Agr. (Wye), A.I.C.T.A.
Senior Examiner	...	...	...A. W. Sears.

CLERICAL STAFF.

Senior Clerk, Head Office	...	...	...J. F. Irving, M.C.
Accountant	...	...	.. J. A. V. Bourne.
Librarian	...	...	...E. L. N. Boston.
Clerks	...	...	...O. Bardou, D. M. Terrill, M. Cheong, M. M. Smith.
Clerk, Botanic Gardens	...	...	...G. L. Leitch.

SUGAR EXPERIMENT STATIONS.

Agronomist	...	...	...C. H. B. Williams, Dip. Agr. (I.C.T.A.).
Field Manager	...	...	...C. Cameron.
Laboratory Assistant	...	...	...L. A. Robinson.
Field Assistant	...	...	...L. A. Forte (seconded).
Field Assistant	...	...	...B. A. McArthur.
Clerical Assistant	...	...	...J. B. Bourne.

In collaboration with the Officers of the Department of Agriculture.



British Guiana.

ADMINISTRATION REPORT

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DIRECTOR OF AGRICULTURE

FOR THE YEAR

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REPORT OF THE DEPARTMENT OF AGRICULTURE FOR THE YEAR 1931.

I have the honour to submit my report on the work of this Department for the year 1931, to which is appended my report (as Chief Colonisation Officer) on the working of the Anna Regina-Bush Lot Schemes for the same period.

2. It has not been convenient this year to present in one volume the Administration Report and the Reports of the various Divisions, as such a publication would have been unwieldy on account of the increasing volume of work to be reported on. As I regard the publication of the Divisional Reports essential for record and reference, their issue in two separate parts is contemplated.

STAFF.

3. Mr. D. D. Haynes, part-time Assistant Instructor, was appointed to the post of District Agricultural Instructor on January 1.

Major T. Bone, O.B.E., Government Veterinary Surgeon, carried out a tour of the Rupununi District from January 15 to April 11 for the purpose of collecting information on certain problems relating to the livestock industry.

Miss J. Pestano, 6th Class Clerk, resigned her post on January 15.

Mr. E. Beckett, Agricultural Superintendent, North West District, was granted six months leave of absence from November 27, 1930, to August 11, 1931. *En route* from England Mr. Beckett visited Trinidad for one week for the purpose of collecting information on citrus work in that Colony.

Mr. J. D. Gillespie, Agricultural Superintendent, West Demerara, was temporarily transferred to the North West District during Mr. Beckett's absence and Mr. H. D. Huggins, Assistant Agricultural Superintendent, Demerara, was appointed to act *vice* Mr. Gillespie.

Mr. R. R. Follett-Smith, B.Sc., A.R.C.S., Chemist-Ecologist, left the Colony for Trinidad on February 12 on two weeks casual leave of absence.

Professor the Hon. J. S. Dash, B.S.A., left the Colony on March 24, for Canada, *via* the Spanish Main, Curacao, Haiti and New York on six months leave of absence. In July the Director attended the Conference of Colonial Directors of Agriculture and the Imperial Sugar-Cane Research Conference held in London. The Director also represented British Guiana at the Toronto Exhibition held in Toronto in August and September, returning to the Colony on November 29.

During Professor Dash's absence, Capt. F. Burnett, M.C., M.A. (Oxon.), Deputy Director of Agriculture, was appointed acting Director and a member of the Legislative Council in place of Professor Dash.

Mr. C. O. Dowding, Agricultural Instructor, East Coast, Demerara, left the Colony on May 5 on six months leave of absence and returned on November 2.

During the absence of Mr. Dowding, Mr. D. D. Haynes was appointed to act as Agricultural Instructor, East Coast District.

Mr. E. B. Martyn, B.A. (Oxon.), Botanist and Mycologist, and Superintendent of the Botanic Gardens, left the Colony on June 11 on leave of absence and returned on November 26.

Mr. J. A. V. Bourne, Accountant, left the Colony on leave on June 18 and resumed duty on November 16.

During the absence of Mr. Bourne, Mr. A. A. Thorne, jr., was transferred from the Treasury Department to act as Accountant.

Mr. C. H. B. Williams, Dip. Agr. (J.C.T.A.), Sugar-Cane Agronomist, left the Colony on June 11 on duty leave, to visit the neighbouring sugar-producing West Indian islands—Trinidad, Porto Rico, Guadeloupe, Barbados. A full report on this visit has been published in the *Agricultural Journal* of British Guiana, Vol. IV., No. 3. Mr. Williams returned to the Colony on August 5.

Mr. L. D. Cleare, F.L.S., F.E.S., Entomologist, was seconded on July 9 for research work on the control of sugar-cane moth-borers; funds for this work being provided by the Empire Marketing Board.

In consequence of Mr. Cleare's secondment, Mr. F. A. Squire, B.Sc. (S.A.), F.E.S., was appointed Supernumerary Entomologist and arrived in the Colony on July 8.

Mr. E. M. Peterkin, Agricultural Superintendent, East Demerara, left the Colony on August 8 for Barbados on sick leave, returning on August 20.

Mr. L. E. W. Codd, M.Sc., has been appointed Plant Breeder and arrived in the Colony on September 20. It has only been possible to make this appointment through the financial aid received from the Colonial Development Fund for rice research.

EXPENDITURE.

4. The total vote assigned to the Department by the Legislature at its session for the year 1931 was \$113,756. The following expenditure was voted on Supplementary Estimates during the year 1931.

Fixed Establishment.—

		Excesses to be met from savings.	Supplementary appropriation.
Entomologist	...	\$ 560 00	
Agricultural Superintendent, Berbice	...	25 00	
<i>Other Charges.—</i>			
Travelling Expenses	...	600 00	
Freight, Insurance, etc.	...	140 00	
Expenses Buenos Aires Exhibition	...	...	\$ 480 00
Expenses Canadian National Exhibition	...	...	511 00
Passage of Supernumerary Entomologist	...	...	23 50
		<u>\$1,325 00</u>	<u>\$1,014 50</u>

TABLE I.
ANNUAL ESTIMATES.

No. of Sub-vote.	Sub-vote.	Balances Unexpended.	Excess Expenditure.
1-33	Personal Emoluments—Fixed and Unfixed	...	\$ 102 66
	OTHER CHARGES.		
34-35	Travelling Expenses	...	548 45
36	Library and Publications	...	
37-42 & 58	General Expenses	\$ 47	
43	Provision and Maintenance of Scientific Apparatus...	19 73	
44-45 & 51	Botanic Gardens, Government Gardens and Grounds	173 35	
46	Purchase, Production and Distribution of Seeds, etc.	17 43	
47-49	Experiment Stations	17 27	
50	Live Stock—Purchase and Maintenance of	430 62	
52	Grants-in-aid for Exhibitions, &c.	142 21	
53	Miscellaneous expenses, Rice Grading	10 58	
54	Subsidies to Agricultural Instructors	521 18	
55	Agricultural Apprentices	...	
56-57	Veterinary and Plant Pest Preventive Measures	126 20	
59	Soil Survey	420 68	
60	Purchase of Typewriter	405 35	
61	School Gardens	225 00	
		392 89	
	TOTAL	\$ 2,907 96	\$ 651 11

The payments into the Treasury during the year were as follows :—

Agricultural Stations	...	...\$1,106 18
Livestock Division	...	... 754 68
Botanic Gardens, Economic & Ornamental Plants	...	... 632 64
Sale of Official Publications	...	... 77 92
*Rice Grading Fees (New Amsterdam, Georgetown and Essequibo)	...	... 293 96
		\$2,865 38

METEOROLOGY.

5. The following are abstracts of the Meteorological observations recorded at the Botanic Gardens, Georgetown, and at the Penal Settlement, Mazaruni, during 1931 ;—

Meridian of longitude for calculation of time adopted as standard in the Colony	...	...	...	60° W.
Hours slow of Greenwich time	...	...	...	3.45

Georgetown.

6. The Meteorological Station is situated in the Botanic Gardens at a distance of 1.45 miles south of the coast-line. The hours of observation are 7 a.m. and 1 and 6 p.m., local official time which is 3.45 hours behind Greenwich time. The height of the barometer is 6 feet 6 inches above the mean sea level.

7. During the year 1931, the air temperature in the shade as recorded by the dry bulb thermometer, for the months of January and December was lower than the mean shade temperature recorded over the period 1846-1930. The highest temperature recorded was 90.0° F. on April 16 and July 11, while the lowest was 71.0° F. on the nights of February 2 and November 1. The mean shade temperature for the year, was 81.3° F. or 0.9° higher than the average from 1846-1930. The total rainfall was 69.26 inches as compared with 84.87 inches in the year 1930 and with 88.20 inches for the period 1880-1930. The total rainfall from January to April inclusive, was 7.57 inches as compared with 22.64 in 1930. Although the total rainfall for the year was the lowest recorded since 1925, yet it was well distributed over the year. As in the previous year, the rainfall in May, June and July was the heaviest. For the months of July to December the rainfall was 38.73 inches or 1.40 below the average. The evaporation from a free water surface, a six feet square tank, at the ground level was 66.01 inches as compared with the normal evaporation of 57.90 inches; the evaporation for 1931 being 95.31 per cent. of the total rainfall. The total amount of bright sunshine for the year was 2,650.5 hours as compared with 2,566.3 hours in 1930, and with 2,474.4 in 1929 and was 180.6 hours above the average from 1846-1930. The mean radiation temperature (blackened bulb in vacuo) was 6.4° higher than normal and 1.6° F. higher than that of the previous year, the maximum monthly record during the year being 163.0° occurred on February 27. The mean minimum temperature on grass was 2.2° higher than the average. The mean velocity of the wind was 6.18 miles per hour, the maximum velocity being 20.00 miles per hour.

Mazaruni.

8. A sub-station established at the Penal Settlement, Mazaruni River, is in longitude 58° 38' 45" W. and latitude 6° 23' 35" N. at a distance of 42 miles south of the coast-line. The hours of observation are the same as at the main station in Georgetown. The height of the Barometer is 55 feet above mean sea level.

9. During 1931 the mean shade temperature was 79.4° F., the maximum temperature recorded being 95.0° F. on November 4 and 5, while the minimum

*This does not include the regular rice grading fees collected by the Customs Department as provided in the Ordinance.

69.0° occurred on January 17. The total rainfall was 83.41 or 5.45 inches higher than that of the previous year. The rainfall for all the months except July, August, September and October was higher than that of Georgetown.

10. The total rainfall was 14.15 inches more than that of Georgetown. Rain fell on 218 days of the year as compared with 192 in Georgetown. The total amount of bright sunshine recorded during the year was 2,098.9 hours as compared with 2,650.5 hours at Georgetown.

PRINCIPAL CROPS.

Sugar.

11. The total area under sugar cultivation in the Colony during the year was 61,097 English acres as against 57,244 acres for 1930. The yield was equivalent to over 2.3 tons per acre. The area reaped, as shown by the census returns, was 54,999 acres yielding 126,143 tons sugar, while the export was 119,346 tons; as against the figures for 1930 of 127,764 tons produced from 54,264 acres, with an export for that year of 114,542 tons. The rum produced was 1,002,267 gallons and 722,076 gallons were exported, as against an export of 846,317 gallons in 1930. The export of molasses was 7,106,997 gallons, an increase of approximately 100 per cent. over last year, while 66 tons of molascuit (cattle food) were exported. As in previous years, the variety of sugar-cane mostly grown in the Colony is D. 625; there are also small areas of B.H. 10 (12), Diamond 10, D. 419, D. 118, D. 145 and D. 663/13, while several of the promising newer varieties grown at the Sugar Experiment Station are receiving attention in estate nurseries with a view to extension and trial on a larger scale. This applies particularly to varieties D. 602/22 D. 251/20, and D. 814/12. Favourable reports have been received regarding P.O.J. 2878, which is being rapidly extended on a field scale.

12. Table II. shows the acreage, production and exports under this crop from 1921 to 1931:—

TABLE II.

SUGAR.

Year.	Sugar Cane acreage under cultivation.	Tonnage of Sugar produced from acreage reaped.	Tonnage of Sugar exported.	Rum produced proof gallons.	Rum exported proof gallons.	Molasses exported in gallons.	Molascuit exported in tons.
1921	63,420	110,985	108,270	1,806,651	2,228,164	204	1,707
1922	60,761	101,128	90,570	520,141	422,168	76,574	1,072
1923	57,814	90,758	83,166	1,180,072	420,996	65,997	814
1924	57,190	91,782	85,896	2,077,619	769,304	1,160,757	1,102
1925	57,500	107,580	97,728	1,277,900	1,148,124	1,345,243	1,263
1926	58,589	98,152	84,659	1,622,966	789,643	2,017,862	1,075
1927	59,271	114,030	109,616	1,436,010	1,081,120	2,677,457	977
1928	57,625	116,484	114,687	1,745,293	1,260,923	2,873,468	2,082
1929	57,247	117,254	100,449	1,838,353	1,109,482	2,536,623	1,803
1930	57,244	127,764	114,542	1,571,571	846,317	3,851,337	431
1931	61,097	126,143	119,346	1,002,267	722,076	7,106,997	66

Year.	Tons of Sugar Exported.	Value in Dollars.
1921	108,270	\$ 10,099,891
1922	90,571	7,175,169
1923	83,167	10,237,450
1924	85,896	8,432,200
1925	97,723	6,785,740
1926	84,659	6,050,251
1927	109,612	8,787,585
1928	114,687	8,124,666
1929	100,449	5,943,783
1930	114,542	5,418,858
1931	119,346	5,325,765

13. It will be noted that during the past five years 1927-1931 the acreage under cane has remained more or less constant, culminating, however, in a record tonnage of sugar produced last year. The small decrease this year is entirely attributable to the drought that prevailed during the beginning of the year. This chiefly affected the estates on the East Coast where irrigation facilities are not as good as those in the Berbice area.

14. In general, the Berbice estates produce more sugar per acre than do those situated in other parts of the Colony. The Diamond group of estates proves a notable exception to this general statement. It is impossible in the present state of our knowledge to state whether the soils of Berbice are better suited to the cultivation of cane, but with regard to climatic conditions, the rainfall of Berbice is lower than that experienced in Demerara County, or on the Essequibo Coast; on the other hand, Berbice Estates possess a more assured irrigation supply from the Canje Creek. It is generally believed that climatic conditions affect the sucrose content of the cane whilst soil conditions, manurial treatment and water supply are factors which affect the actual tonnage of sugar produced. Judging from the factory returns of sucrose per cent. cane, it would appear that the differences are mainly in the tonnage of cane reaped per acre and not in the sucrose content of the cane. Soil conditions, manurial treatment, adequate water supply can, therefore, be considered as factors which govern the superior returns of the Berbice Estates. Again, the soils of the sugar estates have become very acid and it is probable that some estates have been following a more consistent liming programme.

15. The position in regard to rum is causing some anxiety as it will be seen from the table that the manufacture and export of this by-product are declining. There appears to be an increasing consumption of rum in Canada, due to abolition of prohibition. The bulk of imports (valued in Canada in 1929 at \$4,800,000) comes from the United Kingdom and, therefore, it is likely that Colony rums find their way to the Dominion through this source. The quantity shipped to Canada direct during 1931 amounted to 44,167 proof gallons (out of a total export of 722,076). Now, owing to the peculiar methods adopted in this trade, it seems improbable that the export market for *rum in bulk* is likely to be diverted through direct channels and thereby included among our own exports to Canada. There is, however, an increasing demand for special mark rums, bottled at their source, and the more so because many of the Provinces have no bottling plants, the liquor commissions of such, dealing exclusively in bottled liquor. Cuba, for example, has a special blend cocktail rum known as "Bacardi" which retails in Canada at \$5 for a 26 oz. bottle. Demerara Rum, however, is a well-known product and full advantage of this fact should be taken by all local exporters.

16. In regard to molasses, while exports for 1931 have practically doubled the 1930 figures, the future is somewhat obscure since any decrease in production of fuel alcohol owing to the depression may mean that the utilisation of this waste product will have to be increasingly sought locally. Molasses contains most of the mineral salts present in the cane and its possible use as a fertiliser should be fully exploited by the sugar estates. Since it is very bulky, cost of transportation and handling will play an important part in its economic use on cane-fields. Its greater use in the feeding of all classes of livestock should be envisaged.

17. *Research.*—Meetings of the Sugar Experiment Stations' Committee have been held regularly. The Committee in January, 1931, comprised the following:—

Director of Agriculture, Chairman.
 Hon. G. E. Anderson, Plantation Diamond.
 Mr. A. E. Craig, Plantation Ogle.
 Mr. J. C. Gibson, Plantation Port Mourant.
 Mr. C. Farrar, New Amsterdam, Berbice.
 Hon. R. E. Brassington, Georgetown.
 Mr. A. Murison, Plantation Uitvlugt.

Mr. Craig resigned his post on the Committee on April 8 and Mr. J. Bee of Pln. Albion was appointed in his stead. The Committee, thus constituted, functioned for the remainder of the year, the Deputy Director of Agriculture acting as Chairman during the absence, on leave, of the Director. Close co-operation exists between the Department and the Sugar Producers who contribute a cess of 25 cents

an acre under the British Guiana Sugar Experiment Stations' Ordinance, No. 7 of 1929, for the maintenance of sugar experimental work.

18. A full programme of research work for the benefit of the sugar industry has been continued on the main station, Georgetown, and, in addition, on many of the estates during the year.

19. At the main station, Georgetown, the breeding and selection of seedlings are progressing as rapidly as funds will permit, and a considerable number of new crosses is being tried with, so far, very fair promise of success. Large numbers among the older batches of seedlings have been eliminated. Fifty of the Station's seedlings and ten introduced canes have now been sufficiently multiplied to enable their being experimented with in replicated tests. Twenty-two varieties have been imported during the year, making a total of some forty varieties introduced during the past three years. Many of these were selected by the Agronomist on the occasion of his recent tour of the neighbouring West Indian sugar producing Colonies, which is fully dealt with in the *Agricultural Journal* of British Guiana, Vol. IV., No. 3.

20. The following experiments have been laid down during the year at the main station :—variety trials 8 ; spacing trials 2 ; whilst the experiments in progress were :—3 variety trials ; 3 manurial trials, 1 spacing and 2 under-drainage trials. On the estates the following experiments were laid down during 1931 :—6 variety trials and 3 manurial trials, whilst the experiments in progress were :—5 variety trials and 4 manurial trials, making in all a total of 37 experiments in operation during 1931.

21. Of these, eight variety trials were reaped during the year ; almost all were plant cane experiments, and it would be unwise to draw any definite conclusions until more data are available, but there are strong indications that several seedlings are probable rivals of D. 625, and that one or two are possibly better. All these trials are being continued as ratoons, in addition to the fourteen new variety trials which have been started at various points during the year.

22. The policy at present, as in the past, is for variety work to occupy the premier position on the Station's programme. It would not have been possible, however, to have laid down additional variety trials at the main station during the year, if funds of the Station had not been augmented by the receipt of a grant of \$4,800 from the Empire Marketing Board. This has enabled certain urgently needed fields to be re-conditioned and brought into cultivation.

23. Record distributions of planting material (over 400,000 cuttings) have been made and it is interesting to note that the majority of the planters are taking greater care of their nurseries and following up the seedlings and the experimental work very closely, giving the fullest co-operation possible.

24. Interesting and valuable results have been obtained from a number of manurial trials reaped at the Sophia Station and on certain sugar estates. It has been proved that pulverised limestone gives marked and statistically significant increases in cane yields on the heavy clays. This fact is of considerable importance when it is considered that almost all the coastland soils are no longer alkaline, as in the days of Harrison's experiments, but are now definitely acid. Almost all the liming done previously in the Colony has been done with burnt lime, and there is some difference of opinion as to the relative merits of this product and of ground limestone for correcting the acidity of the soil. Also laboratory examination and the results of field tests point to the need for several tons of limestone per acre (at the main station, Sophia, significant increases were obtained over the controls and over each other by doses of 3, 6 and 9 tons respectively), whereas local practice is to apply half to one ton of burnt lime. In consequence, two further tests have been started, one on an acid front land clay and one on an acid worn out pegasse "ab 13k,"

comparing burnt lime and ground limestone in doses of 1, 2 and 5 tons per acre, respectively.

25. Another important deduction from the manurial trials is that certain expensive fish manures, which have been purchased here in the past, and such leather by-products as Leathermeal and Kerazotine are not only a great deal more expensive than Sulphate of Ammonia at equivalent doses of nitrogen, but less effective. In regard to Sulphate of Ammonia itself, the experiments indicate that it would be profitable to increase the doses now used to four or six cwt. per acre, at least on unflooded lands, whilst on flooded fields, smaller doses of Sulphate of Ammonia are required to produce economic returns.

26. The earlier plant cane manurial trials are being continued as ratoons and, in addition, three new ones have been laid down during 1931.

27. The results from the bamboo drainage experiments clearly demonstrated that bamboo drains, laid across the field beds at a depth of two feet and covered with cane trash and then soil, will give marked and statistically significant increases in the yield of plant canes. The economic aspect of their use will depend mainly on their "life," and this factor is being investigated. It has already been proved that the beneficial effect is maintained on the first ratoons. These experiments should be of special interest to estates in demonstrating the value of subsoil drainage, and whereas it may not be practicable at the present time, on account of the capital costs involved, to initiate such work, the success achieved has given ample proof of its economic value.

28. Researches on the soils of the coastal lands and sugar estates have been continued during the year by the Chemical Division, with the assistance of Mr. J. F. Williams, a graduate from the Imperial College of Tropical Agriculture, under an arrangement with Messrs. Booker Bros., McConnell & Co., Ltd., who are providing funds for a soil survey of their estates. Investigations have been made of the soils of Cane Grove and Tuschen and full reports with recommendations submitted. Soil samples have also been taken from the Uitvlugt, Wales, LeRessouvenir, Lusignan and Nonpareil Estates. Manurial trials in conjunction with these soil surveys are of first importance, more especially as past experiments were at no time applied to cane cultivated on the pegasse areas.

29. The marked acidity and high lime requirements of the cane soils of the Colony have been already referred to. Methods for correcting this and for increasing the economic efficiency of the valuable practice of flood fallowing—an outstanding feature in local cane husbandry—are receiving the close attention of the Chemist.

30. The moth-borer investigations, recently initiated with the aid of the Empire Marketing Board and to which further reference is made in paragraph 34 (2), have already begun to yield results of practical importance. From a comparative study of varietal resistance undertaken at Sophia among a representative number of varieties—introduced and local—it would appear that the standard local cane, D. 625, and its progeny are definitely more susceptible to moth-borer attack than the better known Barbados and Java canes. It will be interesting to observe the degree of resistance offered to borer by certain Java-Demerara and West Indies-Demerara crosses which have already been produced and are being studied at the Station.

31. *Cane-farming*.—Cane-farming remains one of the chief activities of the West Indian farmers on the East Coast of Demerara. Towards the end of the year, special efforts were in progress by the Department leading to an extension of cane cultivation on a co-operative block system in the villages. At the present time the cane cultivations are in the nature of scattered small holdings and the best economic results are, in consequence, unobtainable. Valuable money prizes are being offered to further this scheme and farmers are generally co-operating with a view to just-

ing their cultivations accordingly. Applications for sufficient planting material are causing the Department considerable anxiety and owing to the lack of funds, it has been impossible to meet immediate requirements. In this connection, however, neighbouring estates have rendered sympathetic assistance, and I wish to record the Department's appreciation of the help given by the managements of the estates concerned.

32. Viewed from the standpoint of total cane produced, the tonnage of farmers' canes usually offered to the factories is so small that it has no effect in bringing down operating costs, and the hope of lowering costs by increasing production is the only reason, in a business sense, that will influence the estates in encouraging cane-farming. Generally speaking, the estates, while arranging as far as practicable that there shall be no loss, do not make any profit out of grinding farmers' canes; and therefore, the handling (with two exceptions) of the comparatively small quantities offered occasions only some inconvenience and trouble to the factories with poorer juice results in many cases. The support of the industry given by the planters, therefore, may be said to be extended only in the hope that in the course of time there will be such expansion as will make these canes of practical value to the estates, at the same time assisting the villagers to develop an industry for which they are eminently suited.

33. *Grants-in-aid.*—(1) During 1931, the Empire Marketing Board made a free grant of £1,000 for the purpose of assisting sugar-cane research, which was expended as follows:—

Field Experiments ...	...	\$ 3,124 72
Entomological Laboratory for Moth-Borer research ...	...	999 19
Equipment and Apparatus ...	...	661 37

It is hoped that a similar grant will be made for 1932 and continued for a further period of three years to enable accumulation of ratoon trials and the large number of new experiments initiated to be carried through to the end of their cycle. Forty-four trials will have to be reaped in 1933, involving 2,848 plots and, in 1934, 2,924 plots as compared with 1,920 plots in 1932. This will tax the available resources of the Station's funds and unless the subordinate staff is increased, additional experiments cannot be undertaken. In fact, the present programme outlined, involves the working of the present staff to the utmost limit with a great deal of overtime. No allowances have been made for vacations or long illnesses and when these occur additional help will be necessary. It would be disastrous if during the present period of depression, a severe set-back were given to the excellent start made in solving the field problems of the sugar industry, so vital to the welfare of the Colony.

(2) A free grant of £2,475 has also been provided by the Empire Marketing Board, for three years, to enable special moth-borer investigations to be undertaken. By arrangement, the Government Entomologist was seconded for this work in July, when investigations commenced. Reference to the Annual Report for 1929 will indicate the main lines along which these investigations will proceed and results of the work done will be made available to the sugar planters as they are obtained from time to time.

34. *Imperial Sugar-Cane Research Conference.*—During the leave of absence of the Director of Agriculture, he attended the Imperial Sugar-Cane Research Conference, held in London in July, to consider the economic development and maintenance of the Colonial sugar industry and the prosecution of research in relation thereto. The discussions were wide and varied, including not only economics of cane cultivation and production costs, but breeding, soil work, entomological and mycological problems.

35. Two of the outstanding topics, as regards their importance to this Colony, were :—

- (i) Production on large estates as opposed to, or in relation to, a small farming system ;
- (ii) The question of future policy in regard to cane-breeding stations.

In respect to (i), it seemed to be the feeling of the Conference that there was room for both types but that a large amount of information was desired under the following heads :—

- (a) the comparative production costs of both systems when they are found side by side in the same territory ;
- (b) the comparative results obtained in yields of cane from units of area and in the sucrose content of the canes produced ;
- (c) the correlation of such results with the costs ascertained in (a) above ;
- (d) the possibility of making forward contracts which ensure the supply to the factory of the quantities of cane required at prices remunerative to the grower ;
- (e) the scope for the purchase of farmers' canes on the basis of sucrose content ;
- (f) systems of payment for canes which aim at securing a fair division of profits between factory and grower.

36. The general opinion of the Conference in regard to (ii) has already been published in various Sugar Journals. Briefly, it has been suggested that cane-breeding be concentrated in a limited number of stations in the Empire, say four in number, viz., Australia, India, Mauritius and the West Indies.

37. In the West Indies opinion favoured Barbados as the most suitable and central spot. The idea is that while the actual breeding work is done in these centres, they should provide material in the way of seedlings, cane-fluff, etc., to the Departments in surrounding cane-producing zones and territories for the fullest variety ^{trials} with a view to finding out the cane best suited to the particular conditions. This would tend to prevent multiplication of breeding stations in small producing areas and allow for a definite concentration of staff for the more highly specialised work of breeding. Efficient quarantine facilities would be a *sine qua non* to such development and it was proposed that a Central Quarantine Station should be established in Trinidad from which distribution of disease free planting material would be made.

38. After considering the work here, the Conference was of opinion that conditions in British Guiana were such as to warrant the continuation of the investigational work which is now being carried out in the Colony and that it was desirable that this work, as at present organised, should be in no way curtailed. Accordingly, it was strongly recommended that a grant of £1,000 per annum should be made for three years from the Empire Marketing Board towards sugar-cane research work in this Colony.

39. The report of the Sub-Committee of the Conference which dealt with cane research in the West Indies is incorporated in the full report of the Conference Proceedings since published and distributed to those interested.

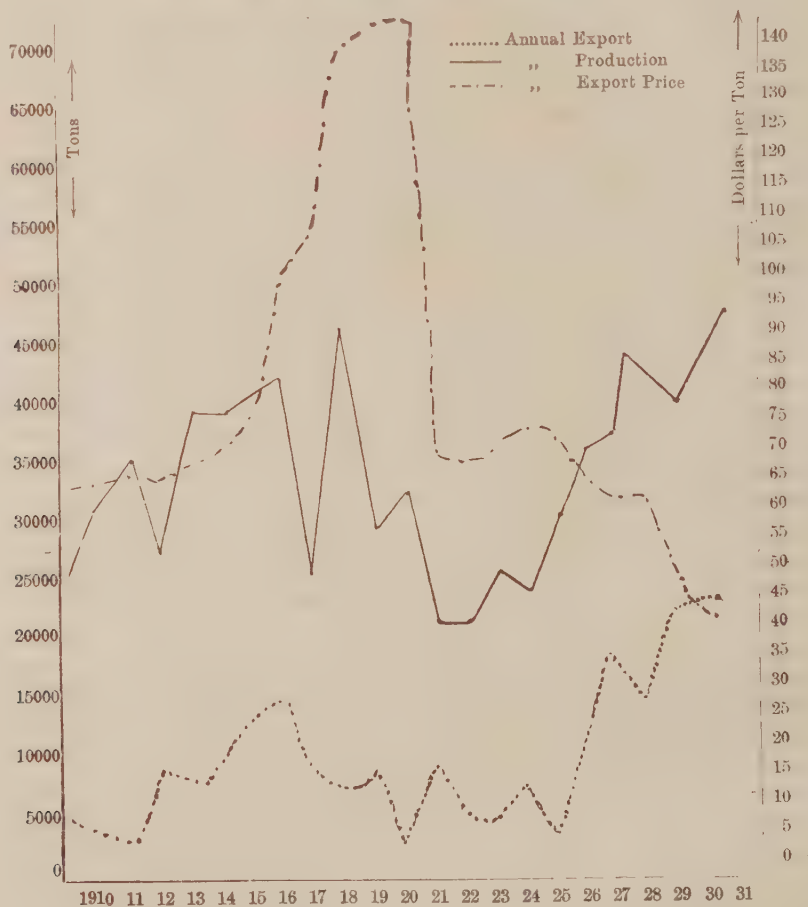
Rice.

40. The area occupied by this cereal during 1931 was returned as 73,647 acres but, including the second or spring crop, the area actually reaped was 79,366 acres. The yield was returned as 1,254,788 bags of 140 lbs. padi equivalent to a yield of 16 bags padi per acre. It is to be pointed out that over extensive areas in the Colony a considerably higher yield than 16 bags per acre is obtained—an average of 20 to 25 bags being not uncommon—but in some districts an appreciable percentage of the Spring Crop is not resown but merely allowed to “spring” from

volunteer padi (*i.e.*, shattered padi which falls from the ripened heads before and during reaping operations). In such self-sown areas it is estimated that the average yield does not exceed 10 bags of 140 lbs. per acre. However profitable this practice proves to be, the average yield per acre for the Colony is undoubtedly depressed thereby.

41. The amount of rice exported was 23,632 tons with a value of \$1,060,339 as against 22,480 tons with a value of \$1,090,431 for 1930. The increase was roughly 1,000 tons over the exports of the previous year, in which 4,000 tons more than in any previous year were exported. Notwithstanding this increase there was a decrease in the total value of exports of approximately \$30,000. The following graph depicts production, exports and export prices of rice over the 22 year period 1910-1931 inclusive. While production and export have reached record high levels, prices are seen to be the lowest yet received.

BRITISH GUIANA RICE TRADE.



42. Table III. gives particulars of rice production and values for the past nine years.

TABLE III.

Period.	Mean Rainfall Coastal Stations Calendar Year.	Areas under rice cultivation. British Acres reaped.				Yields.			Exports.	
		Berbice.	Demerara.	Essequibo.		British Guiana total acreage (reaped).	Padi tons.	Rice, tons (60% yield of cleaned Rice from Padi)	Rice.	
				Mainland	Islands				Tons ex- ported	Value in dollars
1923 ...	80.9	16,460	10,824	7,010	4,421	38,715	33,270	19,962	3,971	273,687
1924 ...	83.54	17,196	10,978	7,383	4,715	40,272	42,100	25,260	4,470	312,567
1925 ...	63.25	16,524	10,093	8,655	4,618	39,890	38,403	23,042	6,918	523,964
1926 ...	74.76	23,871	10,920	9,351	5,303	49,445	49,899	29,939	2,914	218,146
1927 ...	118.63	19,184	13,788	12,585	4,870	50,427	59,748	35,848	11,497	723,871
1928 ...	96.48	20,938	17,002	11,744	5,876	55,560	61,144	36,686	18,083	1,114,147
1929 ...	71.62	26,729	19,927	10,477	6,308	63,441	72,096	43,257	14,091	876,407
1930 ...	84.87	25,370	17,489	10,253	7,230	60,342	64,252	38,551	22,480	1,090,431
1931 ...	69.26	27,773	31,511	9,929	4,250	79,376	78,424	47,054	23,632	1,060,339

43. As indicated in the table above, the total acreage under cultivation for 1931 shows a substantial increase whilst the figures given for the total yield of padi was a record for the Colony and this in spite of the fact that the drought, which prevailed during the early part of the year, adversely affected the yields from the spring crop. There has undoubtedly been increased activity in the rice industry for the period under review, as not only is it the popular agricultural crop with the East Indian cultivators but it still remains their chief money crop.

44. In the principal rice areas of East Demerara one crop per annum is generally grown; in West Demerara, two crops are grown, except on the sugar estate lands leased for rice cultivation, where only one is usually grown. In Berbice one crop is grown per year. In Essequibo, one crop is obtained in the area extending from Supenaam to Suddie, although a second crop is frequently reaped when the rains are sufficient. From Maria's Lodge to Perseverance and from Cullen to Better Success two crops are grown. The autumn crop throughout the Colony is usually sown in May-June and the spring crop in November-December. Better results are always obtained from the autumn crops.

45. With the systematic supply and distribution of selected seed paddy by the Department in all of the rice-growing districts, and with the consequent interest and increased activity in the cultivation of the crop, substantial extension in cultivation has taken place; this extension has occurred not only by the taking in of new lands but by the efforts now being made to grow two crops per year where previously one was grown. It is, however, only in those districts in which there are reasonable irrigation and drainage facilities that the growing of two crops per annum can be undertaken with a degree of assurance, and without imminent risk of failure in at least one of the crops.

46. The chief varieties under cultivation in the various districts are :—

In Essequibo	...	...	Blue Stick.
In East Demerara	...	...	Demerara Creole.
In West Demerara	...	...	Blue Stick and Demerara Creole.
In Berbice	...	...	Demerara Creole.

The shape and size of grain of the Blue Stick variety appear to be decidedly suitable to our milling conditions and, in consequence, rice produced on the Essequibo Coast is, on the whole, of a much higher grade than that of any other District in the Colony. Apart from this, however, the grains of this variety are very easily detached from the stalks and because of this characteristic and as hand threshing is almost invariably practised in Essequibo, the variety has continued to gain favour

in that area. In other districts of the Colony, paddy is to a large extent threshed by the "bull mashing" system, and the factor of easy removal of grains from stalks is not a major consideration; it may even be said that in these districts (*i.e.*, those other than Essequibo), the easy detachment of the grains is considered an unfavourable character on account of the loss which results from shattering during reaping operations. Thus it is that Demerara Creole—a heavy yielding variety with not easily detachable grains—is almost entirely cultivated in the other districts of the Colony. The indications are, therefore, that as soon as mechanical threshers come into general use in the industry, the factor of easy detachment of grains will lose its present significance, and the deciding factors for the extension or otherwise of a variety will be yield, milling quality, stiffness of straw and length of life cycle. Further, it is generally conceded that the threshing of padi with animals unfavourably affects the quality of the finished product.

47. The majority of farmers engaged in this industry are East Indians, but the West Indians are also evincing greater interest in the crop. It is estimated that in East Demerara, 80 per cent. of the rice farmers are East Indians; 15 per cent. West Indians and 5 per cent. other races; in West Demerara 80 per cent. are East Indians, 10 per cent. West Indians and 10 per cent. other races; in Berbice 65 per cent. are East Indians, 30 per cent. West Indians and 5 per cent. other races; in Essequibo, from Supenaam to Suddie, 80 per cent. are East Indians, 15 per cent. West Indians, and 5 per cent. other races; from Maria's Lodge to Perseverance 95 per cent. are East Indians and 5 per cent. West Indians; from Cullen to Better Success 90 per cent. are East Indians and 10 per cent. are West Indians.

48. Although considerable progress has been made, the following are among those factors which tend to impede the extension of the industry :

- (1) *The lack of irrigation and drainage facilities.*—An important factor in this connection is the high cost of empoldering, laying out and levelling new land. The maintenance of dams is also an important item, and the falling into disrepair of the conservancy dams, through which water from the back lands break through, and floods the cultivated fields, continues to be a real and live menace in certain districts whenever excessive rains occur.
- (2) *Insecurity of land tenure.*—The tenant often does not enjoy sufficient protection for crops of rice subsequent to that for which it may have been necessary for him to expend initial labour in order to bring the area into condition for cultivation, *e.g.*, when new lands or old cane beds have to be converted into paddy fields by tenant cultivators at considerable expense.
- (3) *Unstabilized credit facilities.*—The tenant obtains advances either from his landowner (which system has proved itself notoriously unsatisfactory throughout the world) or through the Co-operative Credit Banks which at present unsatisfactorily meet the needs of the small cultivator.
- (4) *Lack of cheap labour during the planting and reaping seasons.*—Under prevailing conditions, especially at harvest time, it is imperative for the cultivator to hire labour to assist in harvesting the crop where his family is not sufficiently large to enable him to complete the reaping and threshing operations during the time the crop is at its best from the point of view of maturity, and to avoid serious loss from inopportune rains. In most districts, therefore, there is a demand for temporary labour for this work, and costs are substantially influenced thereby. Mechanical threshing will assist materially in the solution of this problem and the Department, as noted in para. 62, has through the assistance of the Colonial Development Fund secured threshing machines for demonstration purposes with the object of securing their eventual employment and distribution in the rice districts.

49. *Research*.—Replicated field tests (scientifically planned and laid out, and the results statistically examined) of the different varieties of padi have been continued and selections multiplied for distribution. The following blocks of pure line paddy were established for seed supply :—

Henrietta Station, Essequibo	...	...	5 acres.
Wakenaam	...	...	5 "
West Demerara	...	...	10 "
Central Experiment Station, Georgetown	...	...	10 "
Nonpareil	...	...	10 "
West Coast, Berbice	...	...	10 "
Corentyne	...	...	10 "

50. At the Central Rice Station, Georgetown, progeny row selections for pure seed supply were continued. Collections of varieties from other rice growing countries were maintained, new varieties being introduced and acclimatised. Hybridisation work has also been initiated with the object of obtaining higher yields, shorter cycle and stronger straw varieties; a number of successful crosses have already been made. Altogether about sixty varieties are, at present, under experiment or observation.

51. Varietal experiments were carried out with the six principal varieties, Demerara Creole, H. 7, Blue Stick, No. 75, No. 76, and No. 79, at the Central Experiment Station, Georgetown, and at the Henrietta Experiment Station, Essequibo. These have now been brought to a high standard of purity, productivity and uniformity, by selection methods. In Demerara the highest yield was obtained from No. 79, while in Essequibo there was no significant difference between the two highest yielders—No. 79 and Blue Stick—but it is significant that No. 79 in the 1930 variety trials in Essequibo was the highest yielder. The paddy reaped from these experiments was subjected to a milling trial. In the following Table are shown the percentages of broken and discoloured grains obtained in each sample of milled rice, and the grade into which each sample falls. It is seen that No. 79 appears to possess the best milling qualities. On both field performance and milling qualities this variety is worthy of further extension, especially in districts where Demerara Creole is the popular variety; and steps are being taken to secure this :—

Variety.	Weight of Paddy lbs.	Weight of Rice lbs.	Percentage broken and discoloured grains.	Grade.
No. 75	100	67	19.0	No. 1
No. 76	100	64	16.8	No. 1
No. 79	100	69	7.0	Super
H. 7	100	68	23.6	No. 1
Demerara Creole	100	68	18.9	No. 1
Blue Stick	100	65	9.3	Super

52. Manurial experiments were conducted at the Central Station, Georgetown, and at the Henrietta Station, Essequibo, to determine the effect on the yield of paddy of separate and combined fertiliser treatments. The treatments were ground limestone, superphosphate of lime, sulphate of ammonia, sulphate of potash, green manure (rice straw) and all possible combinations of these. The area chosen at the Central Experiment Station has been continually cropped with paddy for approximately 20 years, and, during that period, the yield of paddy has gradually diminished. At both Stations, statistical analysis disclosed that the manures had no significant effect on the yield of paddy or the weight of straw. No final conclusions, however, can be drawn until the residual effect is examined and the problem further studied. At the Central Station it was observed that lodging was increased by phosphate, nitrogen and straw applications.

53. It is possible that certain obscure factors may be responsible for the reductions in yield which have taken place even in such cases (for example in these manurial trials) when supplies of plant food are adequate. This phase of the problem is being investigated by the Chemist-Ecologist. Its solution should have very far-reaching results since if some growth-inhibiting factor is present on the older rice lands and is capable of decreasing yields, the value of improvements from the distribution of pure line seed and the benefits to be derived from heavier yielding varieties will be compromised.

54. *Pure Line Seed Paddy Distribution.*—In this direction has been one of the Department's main lines of endeavour, and during the past year the Department's efforts have been further reinforced by the financial aid given by the Colonial Development Fund (see para 61). There follow briefly the lines along which this scheme has now been organised for it is fully realised that not only has the distribution of pure seed to be initiated, but the supply and distribution must be maintained during succeeding years, if the benefits resulting from this work are to be sustained.

55. Varieties in local cultivation and varieties imported from other rice growing countries are grown at the Central Experiment Station under the observation of the Plant Breeder (whose salary is borne by the Colonial Development Fund). The most promising varieties are then distributed to the District Experiment Stations where variety trials are further carried out. The varieties which prove themselves to be the highest yielders and to possess the most desirable milling qualities are extended in ten-acre blocks and distributed to rice-growers. These growers cultivate the seed on *Private Seed Farms*, as far as possible under the supervision of the Agricultural Officers of the district. During visits of the district staff special instructions are given in nursery work, removal of volunteer plants, etc., while demonstrations are also given in the field methods of seed selection.

56. On these ten-acre blocks nurseries must be prepared, seedlings transplanted into new land or land which has been ploughed three times, and the maturing paddy rogued to the satisfaction of the Agricultural Officers. To encourage full co-operation of the farmers, paddy competitions are run in the districts and valuable money prizes offered. Further, under this scheme the Department has the option of purchasing any paddy, which may be of a sufficiently high standard for its requirements, at a slightly higher figure than existing rates. The purchased paddy is winnowed, dried and stored in seed barns of which there are now seven erected; these have also been established through the assistance of the Colonial Development Fund. Certificates signed by the Director of Agriculture are given to those farmers who take part in the pure line paddy scheme and whose paddy is of a sufficiently high standard of purity and uniformity.

57. The paddy stored in these barns is distributed by the Agricultural Officers to farmers in the districts at a figure which it is calculated will just cover actual expenses. In addition, certificated farmers are also encouraged to sell their pure line paddy to other growers who may want such paddy for seed purposes. One of the most noticeable effects of this organisation is that the farmer now obtains selected seed paddy in his district with the minimum trouble and expense, and in as large a quantity as is necessary for his planting purposes. Previously, seed paddy was grown mainly at the Central Station, Georgetown, which was unable to supply the full needs of the colony, and which, on account of its remoteness from certain of the main rice-growing districts, could not be used to full advantage.

58. *Grants-in-aid.*—A list of the grants received from the Colonial Development Fund for the development of the rice industry of this Colony during the latter part of 1930 and during 1931 is given below, and discussed under their various allocations.

59. On November 29, 1930, this Government received the following grants for the development of the rice industry of this Colony :—

- (A) A free grant of £1,700 (\$8,160) to meet the cost of the erection of paddy barns and the purchase of weighing machines.
- (B) A free grant of £850 (\$4,080) to meet the salary of the Plant Breeder for three years.
- (C) A loan of £800 (\$3,040) free from interest repayable at the end of five years, to provide a revolving fund for the purchase and distribution of pure line seed.

Under item (A) work on the erection of the paddy barns commenced in April, 1931, and was completed for storing the Autumn rice crop at the following centres :—

Berbice District—Two barns—

- (i) *Whim, Corentyne* : One was erected at Whim, Corentyne, for the storage and supply of seed on the Corentyne Coast.
- (ii) *Customs Bond, New Amsterdam* : Renovations of the old Customs Bond at New Amsterdam for storage and the supply of seed to the Canje Creek and other Berbice areas, including the lower part of the Corentyne.

East Demerara District—Two barns—

- (i) *Golden Grove, East Coast* : One was erected at Golden Grove, East Coast, for the storage and supply of seed on the Upper East Coast, Demerara.
- (ii) *Experiment Station, Georgetown* : Renovations to an old barn at the Experiment Station, Georgetown, for general storage and supply of seed on the Lower East Coast, extending as far as Golden Grove.

West Demerara District—One barn—

Fellowship Police Station, West Coast : Alterations have been made to the disused prison cells at Fellowship Police Station, West Coast, Demerara, for the storage and supply of seed on the West Coast and West Bank, Demerara, and the Island of Leguan.

Essequibo District—Two barns—

- (i) *Anna Regina* : A barn was erected at Anna Regina, Essequibo, for the storage and supply of seed requirements of the Essequibo Coast, extending from the Pomeroon River to Supenaam.
- (ii) *San Souci, Wakenaam* : A building has been rented at San Souci, for the storage and supply of seed to that Island.

Weighing machines have been purchased and sent to each paddy barn.

60. Under item (B), Mr. L. E. W. Codd who was appointed Plant Breeder, arrived in the Colony on September 21, 1931, and assumed the duties of his post the following day.

61. Under item (C), the loan of £800 is being utilised for the purchase of pure line seed paddy in the various districts of the Colony and for distribution to accredited paddy farmers for "private seed farms" for the next season.

62. On August 11, 1931, a further grant of £1,820 (\$8,736) was made by the Colonial Development Fund for the purchase of a rice mill and various units of rice machinery. The rice mill, complete with polisher and glazing drum and capable of milling either parboiled or white rice, was in process of erection, at the close of the year, at Anna Regina, Essequibo, where tests will be carried out during the coming season. In addition to this complete milling plant, the following units have been obtained for trial and demonstration :—paddy sowing machine, paddy weeding

machine, three paddy hand dressing machines and aspirator; power cleaning machine, two power threshing machines, three seed selection (Hand) machines and the necessary engines for driving the cleaning and threshing machines. It is hoped that these machines will show how present labour costs can be minimized and threshing operations expedited especially during rainy weather. Special regard will be given to the economics of these operations. It should be stated that the mill was supplied by Messrs. Lewis Grant of Fife, Scotland, and the threshing and cleaning machines by The Bon Accord Engineering Co., Ltd., Aberdeen, Scotland. Messrs. Booker Bros., McConnell & Co., Ltd., are the local agents for both firms. The visit of Mr. C. E. Douglas in 1929, through the aid of the Empire Marketing Board, served to crystallize the need for modern rice machinery trials in connection with the local industry.

63. *Grading.*—During the year all shipments of rice leaving the Colony have been examined and graded in accordance with the Rice Export (Grading) Ordinance, 1930. Certain amendments were made to the First Schedule of the Regulations under the above Ordinance which took effect from February 1, 1931. In the Grade "Super" the maximum percentage of breakage and discoloration has been increased to 12 per cent.; the class "Ungraded" has been abolished and grade No. 3 substituted; a new grade "Broken" has been introduced, while "White Rice" has been divided into two grades, namely, White Rice Quality "A" and White Rice Quality "B." The amended grade classification is now as follows:—

Class.	Description.	Colour.
Whole grain super ...	Not to exceed more than a total of 5 per cent. of broken and discoloured grains ...	As per guide sample.
Super ...	Not to exceed more than a total of 12 per cent. of broken and discoloured grains ...	Do.
No. 1 ...	Not to exceed more than a total of 25 per cent. of broken and discoloured grains ...	Do.
No. 2 ...	Not to exceed more than a total of 40 per cent. of broken and discoloured grains ...	Do.
No. 3 ...	Not to exceed more than a total of 50 per cent. of broken grains. No fixed colour standard ...	...
Super broken ...	Same colour standard as whole grain super or super; containing more than 50 per cent. broken grains ...	...
Broken ...	Any colour below super; containing more than 50 cent. broken grains ...	...
White Rice Quality A....	To be dry, reasonably clean, white; and to contain not more than 5 per cent. of discoloured grains. (Grains may be of irregular size and broken) ...	As per guide sample.
White Rice Quality B....	To be dry, reasonably clean, white; containing more than 5 per cent. of discoloured grains. (Grains may be of irregular size and broken) ...	Do.

64. The method of analysing samples of rice has been expedited during the year by the aid of a Grantex Separating Machine which has given entire satisfaction. Efficiency tests with this machine show that about 71 per cent. of the broken grains are removed by the machine in three minutes. The residual broken and discoloured grains are removed by hand.

65. Table IV. gives full particulars of the rice exported, from January to December, 1931, according to grades:—

TABLE IV.
AMOUNT OF RICE GRADED IN BRITISH GUIANA—1931.

Months.	Whole grain super.	Super.	No. 1.	No. 2.	No. 3.	White Rice.	Super broken.	Broken.	Total No. of bags.
January ...	151	2,560	3,306	9,436	5,591	449	...	388	21,881
February ...	2	3,041	3,721	15,122	5,747	613	64	...	28,300
March ...	...	4,757	5,662	21,431	5,484	897	100	151	38,482
April ...	200	2,331	5,025	15,744	3,993	149	...	460	27,902
May ...	500	2,822	3,296	14,855	1,681	331	90	100	23,675
June ...	101	5,076	1,928	17,817	1,419	375	52	...	26,768
July ...	350	3,462	1,399	12,391	1,919	399	50	200	20,170
August ...	100	3,360	2,595	16,255	280	133	90	40	22,853
September ...	425	5,383	2,690	14,706	525	62	78	122	23,991
October ...	350	3,664	2,456	15,368	3,143	43	...	111	26,135
November ...	...	6,411	3,709	17,561	3,220	46	80	77	31,104
December ...	25	4,708	3,956	22,137	5,446	26	95	16	36,409
Grand Total	2,204	47,565	39,743	192,823	38,448	3,523	699	1,665	326,670

66. *Markets and Exhibitions.*—The position in respect to exports and values has been dealt with in para. 41 *supra*, from which it will be seen that this commodity has not escaped the depression which has prevailed in the markets of most industrial products; the prices ruling during the year were such as to call for very exacting marketing methods. In addition, there is still competition from Indian rice in the Colony's main markets. It was, therefore, felt that the investigation of the opportunities in new markets which was previously begun by the Department should not be discontinued. The most noteworthy efforts in this connection were in regard to the British Empire Trade Exhibition in Buenos Aires and the Canadian National Exhibition, held at Toronto, Canada.

67. The British Empire Trade Exhibition was held in April, 1931. The trade brochure "Buy Demerara Rice," which had been published in 1930 in English, was translated into Spanish through the courtesy of the Royal Bank of Canada and Mr. A. P. Camisuli, and a large number of these sent to the Exhibition. Attractively put up cartons, each containing enough rice for a single meal, were distributed together with brochures at the Exhibition.

68. On account of the Colony's geographical proximity to the Argentine, it would appear to be to the mutual advantage of this industry and to the Republic if an export trade were established. The main difficulty, however, in entering that market appears to be one of freight as there is no direct steamship service between Georgetown and Buenos Aires. At present Italy supplies much of the Argentine's demand.

69. Cartons of Demerara Rice, together with advertising literature, have been distributed from time to time in circumstances when it was thought that persons interested in the trade might be attracted, *e.g.*, to members of the Canadian Goodwill Delegation proceeding to Buenos Aires by the s.s. "Prince Robert."

70. The Colony also participated in the Canadian National Exhibition held at Toronto during August and September at which the Director of Agriculture represented the Colony. It was impossible to have a large display of Colony produce at the Exhibition, the idea being rather to effect a suitable commercial display of produce such as rice and timber samples in so far as the funds available would allow. A useful and attractive exhibit was arranged which included cooked par-boiled rice, demonstrating its cooking qualities and whiteness as compared with those of ordinary polished rice. Samples which had been suitably put up in packets were distributed free of charge, the demand being greater than the supply. It is gratifying to be able to report that had the material been available and the necessary licence obtained, 5,000 to 6,000 packets of rice could have been disposed of daily, at five to ten cents each, so great was the interest shown. Throughout the Exhibition, the fact that Colony rice is Government graded was stressed.

71. The Toronto "Daily Mail" and "Empire" and the "Canadian Grocer"—Canada's leading Grocery Journal—were most helpful in drawing attention to the qualities of Demerara Rice during the Exhibition.

72. There appears to be little doubt that the colony must make every effort to concentrate on and make its position secure in all neighbouring markets. Thus, among the British possessions in the Caribbean, Bermuda and the Bahamas are not our customers to the extent that they might be. In the case of the Bahamas, if the Canadian National Steamships found it possible to arrange more satisfactory rates to cover transshipment at Bermuda for the Bahamas, this trade might be developed. Further, rice by-products are not being utilised in the Colony to any appreciable extent and their value as a food for livestock is being more and more recognised in countries like the United States of America for the conditioning of steers and pigs. Molasses, rice-offal and copraline—all cheap local products—should have a definite place in future livestock developments.

73. In exploring new markets every endeavour is made to bring to the notice of potential customers the most important facts connected with Colony rice—Demerara Rice is Government graded and therefore a standardised product is guaranteed to all importers of this cereal; secondly, that although Demerara Rice is of a creamy colour, on boiling it becomes pearly white and is indistinguishable from and more nourishing than polished rice. Hitherto, the efforts of the Department have been entirely confined to parboiled rice—the main commercial type now turned out in the Colony—and padi or rough rice for the Canadian market. The impregnable position held by white rice in overseas markets has, however, made it essential for attention to be given to this class of rice. Development necessary for trials with white rice will be made possible by the establishment of a model rice milling plant on the Anna Regina estates through the financial assistance furnished for the project as previously noted by the Colonial Development Fund. It is expected that this mill will be ready for trial by the middle of 1932.

74. It should be emphasised that the value of grading is now beginning to be appreciated in the adjoining markets and this factor undoubtedly has materially assisted in increasing the reputation of Demerara Rice by creating greater confidence, and thereby consolidating and increasing the export trade. At the close of the year the Department had under consideration amendments to the existing grading regulations which amendments included the compulsory blending of rice for export. The value of blending to ensure absolute uniformity in each bag of a consignment of a particular grade has been continually stressed and it is hoped to bring these regulations into operation at an early date.

Coconuts.

75. The area under coconuts in 1931 was returned as 21,760 acres. It should be emphasised that there is a great deal of neglect resulting in uneven stands even in those areas where the crop is already established. This makes it very difficult to secure reliable figures as to the exact acreage actually covered by this crop and those returned for 1931 show a substantial reduction compared with the 1930 figures. The exports for 1931 were as follows:—Coconuts, 1,494,195 valued at \$13,538; coconut oil 20,742 gallons valued at \$9,254 and copra 1,380 tons valued at \$82,629.

76. From Table V. it will be observed that during 1931 there was a substantial increase in the export of nuts over that of the year before—the 1931 figure being approximately two and a third times that of 1930. This increase has been due mainly to revived activity on the New York market, which had doubtless become attractive on account of the existing low value of British currency. It appears, however, desirable and necessary to sound a note of warning as to the selection and grading of nuts before export, as the potentialities of this market will only be ascertained and developed if greater regard than in the past is paid to this phase of marketing.

77. In regard to oil, Table V. shows that there was a small decrease in the exports in 1931—about 6,000 gallons less than in the year before. Since a modern oil plant which is turning out a well refined product of high standard has been established by Messrs. Wieting & Richter, Ltd., this decrease can only be explained if a comparison of the import figures is made. In 1930, 350,802 gallons of edible oil were imported and, in 1931, 187,062 gallons. It appears, therefore, that coconut growers are finding it more profitable to dispose of their copra to the local firm, which in turn supplies the local market with edible oil, than to convert their nuts into unrefined oil or to export their copra (there was a decrease in the exports of copra of approximately $1\frac{1}{2}$ million lbs.).

78. The agricultural operations practised on the majority of local coconut cultivations continue to be most scant. Nor does the average cultivator seem assured that more intensive cultivation will be profitable. Those trees established

on heavy and inadequately drained soils (as are moderately large areas in the Colony) have not been found to respond readily or rapidly to cultural treatment, and, until the Department is provided with facilities for agronomic investigations to be undertaken on commercial coconut cultivation, there is likely to be little improvement in this direction.

79. The Coconut Caterpillar (*Brassolis sophorae* L.) has continued to give trouble, in several cases the pest was found to be very active and rapidly increasing. The control of the pest by hand collection, which was attempted on certain estates, proved effective on a small scale and very definitely helped to keep down attacks within circumscribed areas. For this method to be successful, however, full co-operation of all estates and small holdings in a locality must be assured. It was found that, in the absence of direct supervision, little co-operation was given by the small growers and members of the district agricultural staff were at intervals co-opted to aid in the organisation of these co-operative control measures. Nevertheless, it is apparent that, as undesirable as such a step may be, it will be necessary to make prosecutions under the Plant Pest Ordinance, for, as vigorous as have been the activities of the agricultural officers, the progress made in obtaining co-operative action leaves much to be achieved. The effort to encourage growers to conserve egg and caterpillar parasites by the simple routine system carried out and demonstrated on various estates by the Entomological Division was continued.

80. The Wilt Disease, referred to in previous reports, has again been observed in many districts. The results of examination of soil samples and leaf material collected from affected areas suggested that there was a deficiency in the supply of available phosphate. To confirm these indications, experimental dressings of phosphatic manures were given to palms in all stages of wilt chosen at random on a sandy soil. Although it has not been proved that a deficiency of available phosphate is a major factor in the incidence of wilt, observations were being made at three months' intervals on the reaction of the palms to the phosphatic treatment.

81. The following table gives particulars of coconuts, copra, and coconut oil during 1931 :—

TABLE V.
COCONUTS, COPRA AND COCONUT OIL.

Periods.	No. of Acres (British) under cultivation.	No. Exported to nearest hundred.	Value in Dollars.	Copra, lbs.	Value in Dollars.	Coconut Oil, gallons.	Value in Dollars.
1923	22,970	2,659,000	...	941,000	...	26,621	...
1924	25,201	1,559,800	24,413	1,848,896	71,495	21,804	17,443
1925	29,879	1,363,280	34,293	1,935,110	96,110	30,394	30,394
1926	26,502	816,000	13,727	3,820,432	190,065	18,778	18,590
1927	27,790	334,000	6,015	2,605,818	116,525	25,326	25,326
1928	28,000	322,000	5,944	7,841,904	352,522	26,244	26,206
1929	28,000	637,812	10,614	8,420,160	314,350	20,862	16,730
1930	26,665	629,000	7,846	4,602,400	143,422	26,377	16,059
1931	21,760	1,494,200	13,538	3,091,200	82,629	20,742	9,234

Coffee.

82. The area under this crop in 1931 was returned as 4,657 acres. The exports were 795,479 lbs. of cured coffee valued at \$33,582 as against 367,261 lbs. valued at \$22,400 in 1930.

83. Liberian coffee continues to be the colony's fourth most important crop and is the only crop, of a permanent nature, which is grown satisfactorily on the pegasse soils of the Colony. On account of this soil type being extensively dispersed in certain of the important agricultural districts depressed market situations in relation to this product are reflected with intensity on the economic condition of those localities, viz., the North West District, the Pomeroon and the Canals Polder areas. The substantial increase in exports in 1931 over those in 1930 is therefore viewed with much satisfaction.

84. It should, however, be pointed out that this increase is not as significant as it may appear and is not due to increased production but is due to the exports in 1930 being abnormally low, for in that year, so disorganised did the world coffee markets become that the industry probably passed through the most critical period that has been experienced since its establishment in this Colony.

85. The demand for Liberian coffee is restricted to certain countries, notably the northern countries of Europe, while the Canadian market is showing some interest at the moment. Although the best prepared local beans can almost invariably be marketed, the inferior grades, which constitute a fair percentage of the crop, are disposed of only with considerably difficulty. Consideration has been given to a proposal for the erection by Government aid of central factories to prepare the raw berries of small farmers. A survey of the coffee growing districts indicates that, with the possible exception of the Canals Polder areas, the holdings are too scattered for the general utilisation of such factories to be either practical or feasible on account of the transportation difficulties associated with the bulky raw material.

86. The industry in British Guiana, unlike that in Dutch Guiana, is almost entirely a small man's—a peasant proprietor's—industry and, within recent years, the cultivation of the crop became so profitable that, in most cases, the cultivator extended his cultivation beyond that stage at which all the cultural and harvesting operations could be done by himself and family. With the substantial drop in prices, the peasant proprietor has found it very difficult to continue operations if hired labour charges are to be included in his cost of production. It seems, therefore, that the local coffee peasant proprietor, under existing conditions, will advisably cease to extend his cultivation beyond the limit at which it is easily manageable by himself and family.

TABLE VI.

Periods.	No. of Acres (British) under Cultivation.	Coffee Exported, lbs.	Value in Dollars.
1914-1918	4,713	342,190	
1919	5,125	936,540	
1920	5,032	407,900	
1921	5,030	405,104	
1922	4,240	808,640	
1923	3,916	535,136	
1924	5,765	513,115	56,075
1925	6,243	668,029	114,593
1926	5,226	773,257	132,623
1927	5,272	430,543	68,844
1928	5,894	919,772	187,933
1929	5,905	907,026	104,135
1930	5,096	367,261	22,400
1931	4,657	795,489	33,582

Para Rubber and Balata.

87. The area returned under Para Rubber is 786 acres. This figure is much lower than that returned in 1930. Owing the low price of rubber and the high incidence of endemic leaf disease, the industry is hardly worth considering in the returns.

88. The exports of Balata (*Mimusops Globosa*) were 6,433 cwt. valued at \$203,376, as against 8,888 cwt. valued at \$390,292 in 1930. The gradual replacement of cable services by wireless telegraphy has very adversely affected the trade in this commodity, since balata is used largely for the insulation of submarine cables.

MINOR INDUSTRIES.

Cacao.

89. There has been a certain amount of renewed interest in this crop to meet local demand for the cured bean which has been realising good prices in the local markets. A number of the older areas has been re-conditioned, pruned and excess

shade removed in an effort to minimize the losses due to witch broom disease; while there has been an increase in the number of plants distributed from the Department's nurseries. Pruning demonstrations are being carried out by the Department.

TABLE VII.

Periods.	No. of Acres (British) under cultivation.	Cacao exported. lbs.	Raw Cacao and prepared Cacao imported. lbs.
1904-1908	1,940	73,100	20,590
1909-1913	2,140	54,500	20,970
1914-1918	2,114	34,670	54,020
1919	2,147	9,520	102,580
1920-1922	2,020	(1920) 24,192	(1920) 179,120
1923	1,903	none	189,063
1924	1,918	"	188,373
1925	1,918	"	218,306
1926	1,287	"	174,085
1927	1,256	"	166,539
1928	1,202	"	153,760
1929	1,438	"	123,972
1930	1,438	"	114,282
1931	906	"	131,585

Citrus.

90. During the year interest in citrus growing has been maintained. The demand for budded fruit plants has continued to exceed the supply immediately available. Ten acres of selected budded citrus were planted at the Hosororo Station, North West District, four years ago in anticipation of this demand; these plants have made excellent growth but it will be at least another two years before propagating material can be obtained from them. Meantime, Trinidad and Dominica continue to render valuable aid in supplying budwood. 2,481 budded plants were distributed during the year.

91. In the North West District the lateritic hill soils, which are unfortunately limited in extent, are suited to the cultivation of citrus and there have been increased plantings in the district of grapefruit, oranges and limes.

92. The area devoted to the cultivation of limes during the year was 808 acres; 8,347 gallons of concentrated lime juice valued at \$8,014 and 590 gallons of essential oil of limes valued at \$39,806 were exported. The high price ruling in recent years for essential oils has provided some stimulus to this minor industry, but the synthetic production of citric acid seriously threatens the market for concentrated lime juice and the allied products. 2,123 budded, and 9,742 seedling limes were distributed.

93. The areas suited to the commercial cultivation of citrus are limited, and the plantings of grapefruit and oranges must be planned with a view primarily to meeting the local demand. Time alone will disclose whether there be any possibilities of building up an important export trade.

94. It may be pointed out that such is the organisation necessary in the harvesting, grading, inland transport of these fruit that a peasant industry of any proportion can only be built up easily provided there are large scale plantations, situated in different localities, acting as nuclei and centralising units around which the peasant proprietors operate. It is for this reason that the special efforts, mentioned in the report for 1930, were being made to interest certain of the sugar estates in trying out the possibilities of grapefruit on some of their lighter soils.

95. The following table gives statistics bearing on the lime industry :—

TABLE VIII.

LIMES.

Years.				Acreage planted in limes.	Export of concentrated Lime juice in gallons.	Export of essential oil of limes in gallons.
1919	...	...	...	1,335	10,238	326
1920	...	...	...	1,058	6,001	484
1921	...	...	...	1,102	4,175	544
1922	...	...	...	660	11,156	634
1923	...	...	...	800	11,019	218
1924	...	...	...	711	9,785	396
1925	...	...	...	655	8,430	306
1926	...	...	...	655	4,974	277
1927	...	...	...	669	5,249	273
1928	...	...	...	660	8,124	440
1929	...	...	...	603	12,717	801
1930	...	...	...	703	11,373	660
1931	...	...	...	808	8,347	590

Provision Crops.

96. The area under ground provisions (a name used collectively for plantains, bananas, corn, cassava, sweet potatoes, tannias, yams, peas, beans, etc.) was returned as 16,705 acres as compared with 14,000 in 1930. This increase was due largely to the extension in cultivation of sweet potatoes, plantains, peas and beans. Every effort is being made to reduce the list of imported foodstuffs which include peas, beans and sweet potatoes. An important trade is being built up in plantains with the West Indian Islands, particularly Trinidad, and this Colony's supply of black-eye peas is now being met from local production whereas formerly this commodity was extensively imported.

97. In regard to sweet potatoes, it is generally recognised that the local product does not compare favourably in texture and flavour with the imported article. Accordingly, a number of varieties has been imported and is being tested against those in general cultivation. Also, experiments are in progress with a view to determining the effect of fertiliser applications on both yield and quality. So far, very suggestive results have been obtained from applications of sulphate of ammonia. It will be necessary to determine an economic rate and method of application. The following figures, showing the imports and value of this vegetable since 1929, are significant :—

Year.				Quantity.	Value in Dollars.
1929	...	...	...	1,850,490 lbs.	\$30,557
1930	...	...	...	1,211,486 „	18,878
1931	...	...	...	1,054,805 „	16,275

98. The Colony, as a whole, is exceptionally well supplied with the staple articles of diet of the labouring population but there are here, as in other countries, periods of glut and periods of diminished supply. The high cost of internal transport is a factor which tends to accentuate these fluctuations since it is not an uncommon occurrence for one class of ground provisions to be abundant and cheap in one district, and scarce and comparatively expensive in another. As was pointed out in last year's report, a problem very urgently deserving attention is the marketing and distribution of food crops locally and the possible export of quantities produced in excess of local demand. The organisation of this trade continues to be difficult as disposal is in the hands of small speculators who do not lend themselves easily to co-operative action.

99. There has been continued activity in the cultivation of truck or market garden crops and there is a steady and increasing demand for vegetable seed. One of the crops, in this class, that has been attracting much attention is onions. For the fourth year in succession the Department obtained a supply of onion seed from

Teneriffe and each year, since the inception of this practice, there has been more general interest evinced in the cultivation of this crop.

100. The trials and demonstration plots, on the Department's Sub-Station Cecilia, which is on a sand reef, have done much to draw attention to the possibilities of a comparatively wide range of market garden crops on the sand and loam soil types that occur at intervals on the coastal areas. A major difficulty in the cultivation of these crops is an adequate supply of fresh water after the rains have ceased. This prohibits the cultivation of tomatoes and other fresh vegetables for the winter markets (of Canada, for example), since the period when these have to be planted corresponds to the long dry season in this colony.

Pineapples.

101. Late in 1930, a company of local capitalists, who were reported to be acting in conjunction with Canadian interests, applied to Government for a lease of a tract of land on the left bank of the Demerara River in the vicinity of Dunoon for the purpose of growing pineapples. This development was largely stimulated by the fact that although there was a big demand both in Great Britain and Canada for canned fruit, a large proportion of the trade was in the hands of foreign countries and, further, the advantage of the tariff given by Canada encouraged the diversion of the trade into Empire channels.

102. The Soil Chemistry Division of the Department conducted a reconnaissance survey of the area and the chief points brought out in the resulting report were:—

- (1) The soil type in the area was almost entirely wallaba sand and therefore of very low fertility. Laboratory examinations indicate that this soil type possesses little reserves of plant nutrients.
- (2) Conversation with inhabitants of the district and inspection of the cultivations suggest that conditions are suited to the growth of pineapples. It was, nevertheless, pointed out that "little or no reliable information based on direct field experience, in the annals of the local Agricultural Department, as to the agricultural potentialities of the sandy soils of the interior" was available. Continued productiveness will, however, depend upon the augmentation and conservation of soil organic matter and the addition of mineral salts, deficiencies which are now met, to a certain extent, by the practice of shifting cultivation.

103. No information could be given the company in regard to the yield and quality of the fruit which might be grown on such areas. Under the circumstances, therefore, early developments must be regarded in the nature of an experiment to enable the necessary economic data to be secured leading to further extension if conditions warrant.

104. Exclusive permission to occupy the area has since been given to the Company which sought the aid of the Department in obtaining planting material from Hawaii, Porto Rico and the neighbouring French Islands. The varieties consist mainly of Smooth Cayenne and Red Spanish. Under the supervision of an agricultural engineer, experienced in pineapple cultivation and canning in Hawaii, an excellent start has been made and about 15-20 acres have been cleared and planted. Preparations were in hand at the end of the year for a series of manurial experiments to be carried out by the Department in an effort to determine the manures best suited, their optimum and economic doses, etc. This enterprise is being regarded sympathetically by Government and an undertaking has been given to the Company in respect to the waiving of certain forms of taxation over a period of years.

Tobacco.

105. In the Canals Polder area (West Bank, Demerara), the crop of importance is coffee. When, therefore, the slump in coffee prices occurred and not only was this commodity being sold below production cost but a market was being found for only a limited proportion of the crop, the occasion appeared opportune to suggest trials being made with tobacco planting in the district in an effort to draw attention to the profit and expedience of crop diversification.

106. Selected tobacco seed, grown in the Department's plots, was distributed to a small number of farmers. The nurseries were prepared according to the direction of the Agricultural Officer who, in each case, demonstrated the method of sowing seed in the nursery and the means adopted to overcome seed bed troubles. The plan was that the cultivator of each plot should be paid for all his labour operations, that these cultivations should serve as demonstrations and that there would be, at the end, a small number of farmers in the district well versed in nursery methods and practices, in the control of the "horn worm," in the operations of topping and suckering and in the air curing of the leaf. There was, at first, some difficulty in establishing these demonstration trials and the two important causes responsible were:—

- (1) Farmers in the district were not accustomed to the cultivation of crops of this type and did not fully appreciate some of the exacting requirements involved;
- (2) As soon as the rains held up, the plants suffered severely as the water in the canals, mixed with sea water, was unsuitable for watering.

MISCELLANEOUS.

Forage Crops.

107. The trial and cultivation of forage crops which give indications of suitability to local conditions have been continued at the Department's experiment stations. Guatemala Grass (*Tripsacum sp.*) previously obtained from Trinidad has been rapidly extended, and, subsequently, a large number of cuttings has been distributed to the chief stock areas in the Colony. The grass grows luxuriantly on most soils and is specially recommended for growth near to corrals on the cattle trail. Wynne Grass (*Melinis minutiflora*) has also given promising results and has been distributed to the Rupununi, etc. Demerara Primrose (*Asystasia gangetica*) has continued to attract the attention of stock owners and a desirable feature is that the plant appears to do well, contrary to first indications, on unshaded areas. Para and Elephant Grasses are also good forage producers under local conditions. It may be mentioned that, from the Georgetown Experiment Station, nearly 15,000 cuttings of fodder plants were distributed.

Green Manures and Cover Crops.

108. Experiments are in progress to discover not only the value of these crops in annual-crop practice but also their suitability for planting between permanent crops. These experiments are calculated to be of special significance in the effort to maintain the fertility of sandy and pegasse soils. The only permanent crop supported by the latter is Liberian coffee and the future of both types of soil is problematical unless some economic method of conserving fertility is found. The cover crops and green manures which give most promise for local cultivation are—Bengal Beans (*Stizolobium sp.*), Sword Bean (*Canavalia spp.*), Black Eye Peas (*Vigna sp.*), Bonavists (*Dolichos spp.*) and Crotalaria spp. During the year approximately 1,200 lbs. of seed were distributed from the Experiment Stations for planting in various districts of the Colony.

Mangoes.

109. There is an increasing interest in this fruit overseas, and as mangoes appear to thrive on the coastal clays an effort is being made to encourage cultivation of the better varieties. Reference to this is made in my Canadian Trade

Report, 1930. The new area of commercial types—mostly Julie—which has been recently established at the Experiment Station, Georgetown, is making satisfactory growth, and will provide propagating material for the increasing demand which is indicated in nursery orders. Further, experiments are being continued with top-working in an effort to convert poor trees into useful bearers. Introductions of new varieties are being made from time to time.

Spices.

110. A small area on the lateritic hill lands of the Hosororo Experiment Station is being devoted to trials with spices—grafted nutmegs, turmeric, ginger, black pepper, guinea pepper, cinnamon and tonka beans.

Poison Plants.

111. The experiments with poison plants at the Hosororo and Wauna Experiment Stations, North West District, were continued during the year under review. Twelve acres are occupied by these plants—two acres each under Yarroconalli, with and without shade; two acres each under Black Haiari with and without shade; and two acres each of White Haiari, with and without shade.

112. It will be remembered that this work was started in co-operation with the Rothamsted Experiment Station by the help, now withdrawn, of a grant from the Empire Marketing Board. The programme as laid down calls for a series of progressive tests at varying stages of growth with the idea of determining the insecticidal value of such plants in relation to their culture and development. By arrangement, material from these plants was forwarded to the Rothamsted Experiment Station, Harpenden, for chemical analyses and report on their insecticidal value, but owing to lack of funds the number of analyses required cannot be undertaken at present. The experiments have reached a stage where it would be advisable to obtain alcoholic extracts from these plants but it has not been possible to carry out this line of work owing to the inadequacy of our present laboratory facilities and to the temporary removal of the grant which, unfortunately, the Empire Marketing Board found it necessary to withdraw as an economic measure.

CENSUS RETURNS.

113. The following tables show the number of acres under cultivation in 1931 in the three counties of the Colony and also summaries for the past 14 years:—

TABLE IX.

Counties.	Nature of Crops and number of Acres on December 31, 1931.							
	Sugar.	Rice.	Cacao.	Coffee.	Rubber.	Limes.	Coconuts.	Ground Provisions.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Berbice	21,062	27,773	40	39	30	528	3,401	3,273
Demerara	39,145	31,511	741	1,872	524	150	13,357	10,624
Essequibo	890	14,363	125	2,746	232	130	5,002	2,808
Total	61,097	73,647	906	4,657	786	808	21,760	16,705

TABLE X.

		Annual Summaries of the Acreage under cultivation during the years 1913, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930 and 1931.								
	Year.	Sugar Cane.	Rice.	Coconuts.	Cacao.	Coffee.	Rubber.	Limes.	Maize, Plantains, etc., and Ground Provisions.	Total area under cultivation.
British Guiana	1913	72,635	33,889	14,177	1,863	3,166	4,018	941	17,580	143,319
Do	1918	73,565	60,432	25,882	1,997	5,158	3,981	1,351	21,959	194,325
Do	1919	70,876	61,200	25,882	2,147	5,125	4,042	1,335	18,192	188,999
Do	1920	69,532	55,246	24,453	1,816	5,052	2,813	1,058	16,583	176,853
Do	1921	63,420	55,911	26,321	1,176	5,030	2,813	1,102	16,378	172,151
Do	1922	60,761	49,073	26,603	1,371	4,241	2,333	660	12,930	157,772
Do	1923	57,814	34,965	22,970	1,903	4,096	2,080	800	11,924	136,552
Do	1924	57,190	29,406	25,201	1,918	5,765	1,655	711	14,444	136,290
Do	1925	57,500	29,333	29,979	1,918	6,243	2,200	655	11,715	139,543
Do	1926	58,589	32,798	26,502	1,287	5,226	2,000	655	14,509	141,566
Do	1927	59,271	37,340	27,790	1,356	5,272	1,800	669	13,855	147,353
Do	1928	57,625	44,359	28,000	1,202	5,894	1,600	660	15,528	154,868
Do	1929	57,247	52,989	28,000	1,438	5,905	1,400	603	13,577	161,159
Do	1930	57,244	49,702	26,665	1,438	5,096	1,400	703	13,604	155,852
Do	1931	61,097	73,647	21,760	906	4,657	786	808	16,705	180,366

COLONIZATION AND LAND SETTLEMENT.

114. The report on working of the Bush Lot Land Settlement Scheme and the Anna Regina properties for 1931 is appended.

AGRICULTURAL INVESTIGATIONS.

115. Field investigations have been carried out at the centres given below. The work undertaken and the results so far obtained with the various crops are given in detail in the Divisional Reports of the officers concerned, while the more important features of such agricultural research connected with the major and minor industries have already been summarised :—

Sugar Cane

—At Sophia Experiment Station, Demerara.

Do.

—At Pln. Diamond, E.B., Demerara.

Do.

—At Pln. Farm. E.B., Demerara.

Do.

—At Pln. Lusignan, E.C., Demerara.

Do.

—At Pln. Nonpareil, E.C., Demerara.

Do.

—At Pln. Uitvlugt, W.C., Demerara.

Do.

—At Pln. Leonora, W.C., Demerara.

Do.

—At Pln. Port Mourant, Berbice.

Do.

—At Pln. Blairmont, Berbice.

Rice, Ground Provisions,
Pulses, Tomatoes, Tobacco, Forage Crops,
Bananas, Mangoes,
Fibres and Green Manures

—At Demerara Experimental Stations,—Georgetown and Cecilia.

Rice, Pineapples and various garden crops

—At Henrietta Experimental Station, Essequibo.

Rice

—At Pln. Port Mourant, Berbice.

Do.

—At Plantation Rose Hall, Berbice.

Do.

—At Pln. Non Pareil, E.C., Demerara.

Do.

—At Pln. Hope, E.C., Demerara.

Do.

—At Windsor Forest, W.C., Demerara.

Tobacco

—Canals Polder, W.B., Demerara.

Coffee, Limes, Citrus and other fruits, Spices, Poison Plants, Provision and Forage Crops, Pineapple, Green Manures, Oil Palms, etc.

—At Hosororo Experiment Station and Wauna Sub-Station, North West District.

ENTOMOLOGICAL INVESTIGATIONS.

116. As anticipated in last year's report, Mr. L. D. Cleare was seconded during the year for special investigations on the biological control of the small moth-borer of Sugar Cane and Mr. F. A. Squire, who assumed duty on July 9, was appointed Supernumerary Entomologist for work on other crop pests.

117. The following have received attention for the period under review and remedial measures recommended :—

- (i) *Sugar*.—Hardbacks or Scarab beetles, *Dyscinetus geminatus* Faby. and *D. dibentatus* Burm. These may be successfully controlled by flooding if discovered in the grub stage.
- (ii) *Rice*.—Two stem borers were reported from various parts of the Colony—*Diatraea saccharalis* F. and *Scirpophaga albinella* Cramer. As a control measure to the first named pest farmers were advised to plough in stubble and flood. The latter insect occurs periodically in great numbers, but does not appear to do much damage; there is a Chalcid egg-parasite and a Braconid larval parasite, both of which are quite numerous when the pest occurs.

The Water Weevil—*Lissorhoptrus simplex* Say, has been noticed from time to time and has been successfully controlled by drying the beds.

The Rice Weevil—*Calandra oryzae* Linn. is still being investigated. Special attention has been given to this during the latter part of the year. The life history of the pest has since been worked out. Experiments in connection with control were carried out both in the laboratory and at various wharves and warehouses.

- (iii) *Coconuts*.—The Coconut Caterpillar—*Brassolis sophorae* L. has occurred in small numbers throughout the year. The following parasites were found in large numbers :—Egg Parasites—*Telenomus nigrocoxalis* Ashm. ; Larval Parasites—*Spilochalcis brassiolis* Schr. and *Chalcis annulata* F. Certain estates on the East Coast had collecting gangs working whenever an outbreak occurred.

Cockles.—*Strategus aloeus* Fabr.—quite frequently attack young coconut palms. It is advisable for planters to make routine inspections of their young trees which may be seriously damaged before the mischief is plainly noticeable. The beetle may be got rid of by pouring water or kerosine or by placing a piece of calcium carbide in the hole.

- (iv) *Pineapples*.—The Pineapple Bug—*Athaumastus laetus* Mayr. Various sprays were tried out as a control measure for this insect. The investigation is proceeding.
- (v) *Miscellaneous*.—A species of *Melipona* has been troublesome on citrus as well as other plants. Spraying with white hellebore was recommended.

BOTANICAL AND MYCOLOGICAL INVESTIGATIONS.

118. A non-infectious chlorosis of sugar cane was found affecting one or two seedling canes in the Corentyne. The extent of the disease was slight. In appearance, it resembled a chlorosis described in other cane-growing countries and attributed to a deficiency of Manganese.

119. Inoculation experiments carried out with the *Fusarium* found associated with "Man Rice" showed that it is ~~to be~~ capable of killing seedling plants under conditions favourable to the fungus. An apparently similar disease of rice is reported from Madras, where, however, it causes greater damage than is done locally.

120. The experimental planting of European Rice Grass *Spartina Townsendii*, on the foreshore at Liliendaal, East Coast, Demerara, has been kept under observation. The plants in the plot covered by every tide have begun to spread somewhat, but their extension is slow, and is still confined to the small area originally planted.

121. A small botanical collection was made on the lower Cuyuni River when the Botanist accompanied the officers of the Forestry Department during a part of their survey. Specimens were sent to Kew for determination, together with a number of pasture grasses from the Kupununi.

122. Determinations were received during the year from the Royal Botanic Gardens, Kew, of plants sent there during the past two years. Material of the Orchidaceae which had been lent to the New York Botanical Gardens was returned, after examination by Professor Ames.

123. The Botanist was on leave from June 11 to November 26.

CHEMICAL INVESTIGATIONS.

124. The Chemical Division has been occupied with soil survey work on the coastlands and in the interior. Special investigations of the effects of flooding cane soils, of the wilt disease of coconuts, of the soluble salt content of cane soils and of the soil types of the interior have been carried out. Much time has been devoted to the design and the statistical reduction of the results of variety and manurial trials with cane, paddy and sweet potatoes. This work has been supported by the examination of soil samples from the various experimental sites and the information obtained should be of great advantage in future advisory work. A large number of analyses of fertilizers, feeding stuffs, pasture grasses and soil waters has been undertaken and the requisite analytical work in connection with the samples of cane from the variety and manurial trials, laid down by the Agronomists, has been performed. A number of advisory visits has been paid to the plantations of the Colony. Attention has been drawn to the presence of soluble salts in cane soils and their probable deleterious effect upon factory recovery, a state of affairs which can only be remedied by efficient drainage.

125. It has often been suggested that the classical manurial cane experiments of Harrison have rendered unnecessary further fertiliser trials. Soil survey work has shown that this view cannot be supported. There is evidence to show that the Colony's cane soils have changed considerably in the past twenty years and that these experimental results at no time applied to the pegasse areas, which form a considerable proportion of the Colony's cane lands. Referring to the use of artificial manures in British Guiana, the Agricultural Adviser to the West Indian Sugar Commission of 1930 states in support of the Department's policy "there is need for a re-examination of the manurial practice this and other manures should be included in trial plots." (Report of the West Indian Sugar Commission 1930, Part IV, page 56).

126. The problem of water fallowing of cane-fields has received attention. Indications are that small applications of lime prior to flooding will reduce the time required for submergence and will be more beneficial than where applied after flooding. This will receive further consideration since such a reduction would be of great value to those estates possessing little spare land.

127. An investigation was undertaken in regard to the loss of sugar in burnt cane left exposed. Exposed in small bundles for twenty-four hours cane loses 10 per cent. of its available sugar. Indications are that this loss can be reduced by watering such cane. It is not expected that the loss in open punt loads will be as great as that reported in this experiment, nevertheless in cane so exposed an effort should be made to reduce losses and the method suggested is worthy of a trial in estate practice.

128. In collaboration with the Agricultural Superintendent, East Demerara, a complex manurial trial with paddy was carried out at the Georgetown Experiment Station. This area has been continuously cropped to paddy for some twenty years and during that period the yields of paddy have gradually diminished. It was confidently expected that applications of manures would produce large increases in yield.

The results of this experiment showed that definite but small increases were obtained. The improvements in paddy yield were, however, so small that the cost of the fertilisers was not recovered. Further reference to this experiment is made in paras. 52 and 52³ *supra*.

129. A detailed soil survey, sponsored by the Department, of the Estates of a large sugar combine is being carried out under the direction of the Chemistry Division as noted previously in para. 28 under sugar research. These surveys are progressing satisfactorily and are producing valuable information in regard to soil conditions and requirements on the estates in question.

AGRICULTURAL EDUCATION AND EXTENSION.

District Experimental Work and Instruction.

130. The organisation of the District Agricultural Staff which was outlined in previous reports has now been completed. It is felt that the District Staff is at present constituted not only to give helpful practical advice to farmers but to carry out those duties which have formed an integral part of the extension work of agricultural departments in countries in which agricultural development has progressed. The more important duties during the year are summarised below :—

- (1) The conduction of field experiments in the districts. Reference to para. 115 shows what work is already being done in connection with the important crops grown in the Colony. In a country of this size and with the varying ecological conditions it is not enough to discover by experiment the optimum doses of manures to be applied or the best variety of sugar-cane and paddy, cultivated on, say, the Central Experiment Station, Georgetown, and to assume that these conclusions apply to each and every part of the Colony. Such experiments must be duplicated in the districts and the inferences drawn confirmed or corrected. Thus, the Department of Science and Agriculture deserves credit of a very high order for the manurial experiments which were carried out with cane at the "Experimental Fields, Botanic Gardens," in the earlier part of the present century, but the benefits of these experiments to the sugar industry were greatly reduced, as the Department did not then have the staff or organisation to repeat these experiments on the sugar plantations and so definitely to discover to what extent the conclusions drawn were applicable to the several estates in the different areas of the Colony.
- (2) The provision of easy facilities for the small farmer to obtain tried and selected planting material. During the year, for the first time, farmers were able to book and obtain seed paddy of selected varieties in their districts, with the minimum of trouble, waste of time and inconvenience to themselves. The seed paddy distribution scheme, which was brought into operation and which made this possible, has already been described. Further, other crop seed (*e.g.*, onions which the Department imports from Teneriffe yearly) and economic plants can now be obtained by applying to the District Agricultural Officers. The increased demand for plants and seeds is testimony to the work being done in this direction.
- (3) The collection of economic data on the crops cultivated. The annual census returns of areas agriculturally occupied were formerly collected by certain Government and Local Bodies that had little direct concern with matters agricultural, but, for the year under review, this information was obtained and classified entirely by the district staff. In addition, a comprehensive investigation was carried out on the major economic factors affecting the local rice industry. The data thus obtained were classified under :—land tenure ; cultivation ; irrigation and drainage ; credit facilities ; manures ;

pests and diseases ; milling and storage. It is felt that the facts and figures compiled should serve as a very useful guide in the efforts which are being made to organise the industry on lines which, while leading to the development of the industry in general, will also ensure the fair distribution of profits among growers, millers, landowners and exporters. A preliminary investigation of the economic factors affecting the Colony's coconut industry was also carried out.

- (4) The inspection of produce for market. The District Officers are appointed Rice Inspectors, in accordance with the Rice (Export Grading) Regulations, and assist generally in all matters pertaining to this phase of production.

131. In addition these officers are the Chairmen of all Co-operative Credit Banks of the Colony. The Agricultural Superintendent, Essequibo, is also in charge of the Bush Lot Land Settlement Scheme. These officers organise and run field competitions in the various districts of the Colony, make frequent visits to agricultural areas in their districts for the purpose of meeting and instructing cultivators, circulating information from headquarters, conducting investigations, and forwarding regular reports to Head Office. It should be mentioned that this work is under the immediate supervision of the Deputy Director, all matters regarding policy being submitted to the Director for his approval and direction. This system facilitates efficiency and provides for the co-ordination so necessary between the different branches of the Department's district activities.

Co-operative Work.

132. As indicated in last year's report all the Co-operative Credit Banks in the Colony have been put under the Chairmanship of the District Agricultural Officers. The business of these banks for the year under review has not been satisfactory due mainly to the financial depression which has tended to reduce the ability and willingness of debtors to meet their obligations. Further, there were attached to securities, when past loans were granted, values which these securities no longer possess on account of the fall in prices of agricultural products.

133. There were on December 31, twenty-seven Banks on the register—15 in Demerara, 8 in Berbice and 4 in Essequibo. At the close of the year the membership of the 27 Banks was 10,910 ; West Indians own 47,237 and East Indians 27,323 shares out of a total issue of 82,492.

134. The lending capital of the Banks is derived from three sources—share capital subscribed by members, Government loans (the balance due to Government being \$31,899.76) and Barclays Bank loans (the balance due to this Bank being \$5,780).

135. Loans are made by the Credit Banks to members only and these are chiefly small agriculturists raising crops of paddy, canes, provisions, etc. Some business is also done with persons engaged in coconut oil manufacture, pig-keeping, cow-keeping, huckstering, diamond seeking, etc. Money is also lent for the repair of buildings and for the purchase of properties.

136. In the following table a comparison of the business done in 1930 and 1931 by all the Banks in the Colony is made :—

TABLE XI.

Year.	Number of Loans made.	Amount Lent.	Loans Recovered.	Interest Collected.
1930 ...	1,324	\$ 36,151 81	\$ 33,041 10	\$ 10,842 34
1931 ...	814	20,738 37	25,588 07	3,963 36

It is certain that Government will lose substantially on loans made to the Wakenaam, Leguan, Den Amstel, Fellowship, Beterverwagting-Triumph and Eldorado Block Banks.

137. On the whole it may be said that the position in regard to these Banks *vis-à-vis* the Department of Agriculture is not a happy one. While it has meant a small saving in administrative expenditure to Government by having the Banks within the scope of the Department, it has to be remembered that the District Agricultural Officers, who must now control the policy of the Banks, are placed in the dual position of both adviser and prosecutor of defaulting borrowers, which is unsatisfactory, since the co-operation and goodwill of those on the land are essential for the success of district agricultural work.

Conference of Agriculturists.

138. On Monday, June 15, His Excellency the Governor opened a three day Conference of those concerned with the development of peasant agriculture in the Colony at the Botanic Gardens. The agenda of the discussions were, on Monday, June 15th, Agricultural Co-operation ; on Tuesday, June 16th, Village Agriculture ; on Wednesday, June 17, the Rice Industry.

139. As there was a representative gathering on each day it was felt that the candid exchanges of opinion, which took place between the officers of the Department and those present, assisted in a mutual appreciation of the aims and difficulties of those interested or engaged in the agricultural pursuits of the Colony.

Unemployment Relief Works.

140. During the year an area of Crown land, in the vicinity of Lodge Village, immediately adjoining the Georgetown Experiment Station, was conditioned and sub-divided into a number of market garden allotments. This scheme had as its objective the affording of occupation to a selected number of unemployed living in and around Georgetown and the establishing of a market garden in close proximity to the city. Fifty-nine allotments, approximately one quarter of an acre each, were taken. The preparation of the land for vegetable cultivation is directly under the supervision of the staff of the Experiment Station. Banana and plantain suckers, cuttings of imported varieties of sweet potatoes and seeds of various vegetables have been supplied to those cultivators. While a few maintained a fair standard of progress, a number did not show that degree of assiduity which is necessary to produce satisfactory results from this type of agriculture on the coastal clays. Nevertheless, in spite of many difficulties these allotments have been very useful to all those who were willing to work.

141. At Anna Regina, Essequibo, a scheme for the development of uncultivated lands was commenced with a view to supplying employment for a number of unemployed agriculturists. This work was under the direction of the Agricultural Superintendent, Essequibo. On an average, 500 persons were employed weekly. As a result of this work, 170 beds have been levelled for paddy cultivation, 200 acres under-bushed for provision cultivation and 200 acres wired in for pasturage. The drainage and irrigation on this area were also extended and improved. This will add considerably to the lands available for peasant cultivation in the district, and, since the sugar industry no longer exists except in one small section of the coast, the value of this extension for other crops is all the more appreciated by villagers.

Local Exhibitions and Competitions.

142. On Saturday, October 3, the British Guiana Poultry Association held an Exhibition in the Promenade Gardens, Georgetown. The Association has been doing valuable service in attracting interest to poultry rearing and this effort to

bring together poultry breeders in healthy competition obtained the success which it deserved. There was a very large and varied collection of exhibits and the birds presented were of a grade high enough to reflect credit on those fanciers who accomplished so much in so short a period, for the raising of grade poultry is a new line of endeavour in this Colony. The Livestock Division of the Department exhibited a Demonstration Poultry Farm, which contained all the equipment necessary for raising chicks, nests for hatching, brooders, appliances for feeding, etc., suitable poultry houses for breeding and growing stock. The favourite breeds, in order of precedence, were Rhode Island Red, Barred Plymouth Rock, White Leghorn, Minorca (Black and Buff) and White Wyandotte.

143. There was held on the Georgetown Cricket Club Grounds, October, 13-17, a Centenary Exhibition and Fair. The Department participated by erecting a booth and there displaying exhibits of local agricultural interest. There could be seen in the Department's stand:—new varieties of cane that showed promise; diagrammatic representations of the methods employed in carrying out manurial and varietal experiments; the rice grading machine and complete collections of the guide samples specified in the Rice Grading Regulations; large sized photographs, as well as living and dead specimens of the important insect pests and the method adopted for breeding parasites of the coconut caterpillar; simply worded descriptions of the advised means of control of the serious pests and diseases; and selected animals and poultry from the Department's Stock Farm. There were also displayed a number of imported articles with similar specimens produced locally. During the Exhibition, officers were on duty at the Department's stand and endeavoured to explain all matters likely to be instructive and of interest to visitors.

144. The following agricultural field competitions were held during the year:—

Rice.—

- (1) For the best block of not less than half an acre of transplanted pure line paddy on the East Coast, Demerara, between
 - (a) Kitty and Mahaica;
 - (b) Mahaica and Abary.
- (2) For the best block of not less than half an acre of transplanted pure line paddy on the West Coast, Demerara, between Vreed-en-Hoop and Hague
- (3) For the best block of not less half an acre of transplanted pure line paddy in Berbice:—
 - (a) On the West Coast at Bush Lot;
 - (b) On the Corentyne between Villages 70-72.
- (4) For the best block of not less than half an acre of transplanted pure line paddy in the Essequibo District:—
 - (a) On the Essequibo Coast;
 - (b) On Wakenaam Island.
- (5) For the best block of paddy grown on the Bush Lot Land Settlement.

Miscellaneous crops.—

- (1) For the best miscellaneous farm on the West Bank, Demerara River, between La Grange and Stanleytown.
- 2) For the best miscellaneous farm on the East Bank, Berbice, between New Amsterdam and Mara.
- (3) For the best miscellaneous farm in Essequibo between Affiance and Richmond.
- (4) For the best miscellaneous farm in the North West District:—
 - (a) In the Koriabo and Aruka districts;
 - (b) In the Barima district.
- (5) For the best miscellaneous garden (including market vegetables and ornamental plants) on the Bush Lot Land Settlement.

Small Farmers' Committee.

145. In April, 1930, His Excellency the Officer Administering the Government appointed a Small Farmers' Committee consisting of the Hon. A. V. Crane, LL.B., (Chairman), Hon. A. E. Seeram, Hon. J. Eleazar, Mr. Abdool Rayman, Mr. C. Rodney and Mr. J. Marshall with Mr. R. Baird (Secretary) to report on :—

- (1) The desirability of village lands being re-surveyed and re-distributed in such manner that individual holdings may be consolidated and farmers encouraged to live on their farms ;
- (2) The possibility of employing communal agricultural machinery ;
- (3) The desirability of a Board of Agriculture being established, and, if considered desirable, what should be its functions and the scope of its activities ;
- (4) The steps to be taken to make agriculture more attractive to the peasant population, with special reference to the unemployed in Georgetown whose labour might, with profit, be given to agriculture ;
- (5) The methods to be adopted to make cane-farming more popular ;
- (6) The crops other than those now under investigation by the Department of Agriculture which, in the opinion of the Committee, might be grown with a view to increasing the volume of the Colony's exportable produce ;
- (7) Whether present marketing facilities and arrangements permit of farmers and growers of ground-provisions and other produce receiving adequate returns on their undertakings ;
- (8) The steps to be taken to establish the systematic rearing of livestock; especially on ground provision farms, with a view to making efficient use of refuse products, at the same time maintaining permanent soil fertility ;
- (9) Any other matters falling within the terms of Legislative Council Resolution No. XI. of December 5, 1929, and to submit a complete scheme for carrying into effect any recommendations made.

The Report was published during the year and is receiving the attention of Government.

Agricultural Courses.

146. The usual work connected with the training of apprentices has been continued at Georgetown during the period under review; practical training is obtained by work in the Department's nurseries, and on the rice and sugar stations. A short course in agricultural science was given by the Assistant Agricultural Superintendent, Demerara. During the year a number of apprentices who had finished their courses obtained satisfactory appointments. In addition to this, a course of lectures with practical classes was given by the Assistant Agricultural Superintendent to the students of the Teachers Training Centre. While admitting the inadequacy of the apprenticeship scheme, it provides at present the only source of supply, to the Department, of young men for filling various subordinate posts in connection with field and nursery work, rice grading, etc.

LIVESTOCK.

147. In cattle-raising for beef production, there is no great progress to report and much remains to be done before the markets in the neighbouring Colonies can be regularly supplied with animals of good average quality. With few exceptions there is still the tendency to breed indiscriminately and, in consequence, there has been no general improvement in type, while the transport difficulties facing Rupununi ranchers are well known. In spite of inferiority, such animals yield a

profit because a local market has given higher prices than world market prices. Before this industry is placed on a sound export basis, a policy must be put into force which will dispose of the inferior cattle and increase the numbers of superior stock. Two desiderata appear to be, first, funds sufficient to establish Government controlled livestock centres, where stud bulls could be located and secondly, a meat factory which would utilise many of the inferior animals. There are also the problems of pasturage and fencing on the coastal belt to be faced.

148. Since the inauguration of the Department's policy of placing pure-bred Holstein bulls at stud, slow but steady improvement is being made in dairy stock, especially in the vicinity of Georgetown, where many young half-bred stock are now being raised and where a distinct improvement in cattle management has been noted.

149. The pig industry is not in a more favourable position than the beef cattle industry, and it is considered that the problems of economic feeding and management adversely affect the profitability and hence the attractiveness of pig-rearing locally. Nevertheless, increasing interest is being shown in the Department's efforts to introduce pure-bred utility types; of these, the Canadian Berkshire has proved very suitable and is popular among pig-breeders to whom young breeding stock have been supplied. In addition, the Farm boars have been fully utilized for stud purposes.

150. Five pens of the White Leghorn and the Rhode Island Red breeds comprise the Department's stock of poultry. Substantial success has been obtained with the White Leghorns. A large percentage of the birds which are at present in the Colony has been bred from these pens; 847 eggs selected for hatching purposes were disposed of in 1931 in addition to 37 cockerels.

151. No large outbreaks of contagious and infectious diseases have been reported.

152. The Livestock Farm, under the management of the Government Veterinary Surgeon, carried on the usual activities during the year. In addition to the rearing of pure-bred stock, one of the chief lines of endeavour has been to investigate the feeding value of local products and to secure balanced rations therefrom in preference to expensive imported foodstuffs. Considerable attention has also been given to the trial of different forage crops and their extension among stock-keepers throughout the Colony. During 1931, there were maintained on the Stock Farm:—cattle—five bulls, four cows and six heifers of Holstein-Freisian breed; pigs—three boars and six sows of Canadian Berkshire breed; poultry—five pens of White Leghorn and Rhode Island breeds; and one stallion donkey.

153. *Tour of the Rupununi Ranches.*—The Government Veterinary Surgeon left headquarters on January 15 for a tour of the Rupununi Cattle Ranching District and returned on April 15. The objects of the tour were:—

- (1) to inspect the grazing areas;
- (2) to obtain information on the methods of breeding and rearing livestock in the district;
- (3) to inspect the cattle trail;
- (4) to study any problem directly or indirectly affecting the development of a livestock industry.

A report of this tour has since been published as a Sessional Paper (No. 6/1931).

154. *Visit of Adviser on Animal Health.*—It was very fortunate for the livestock industries of the Colony that during the course of the year it was made possible

for Mr. R. E. Montgomery, M.R.C.V.S., Adviser on Animal Health to the Secretary of State for the Colonies, to visit British Guiana. This visit lasted from April 13 to May 2. The cost of this visit and of printing the report, which followed, was borne by the Colonial Agricultural Service Fund.

155. In view of the fact that the Colony is endeavouring to build up an export trade in cattle (with a view primarily to capturing beef markets in the British West Indies at present supplied from foreign sources) and as the regular supply of draught oxen for agricultural operations in rice is a factor of great importance to the industry, the attraction of attention to, and investigation of, our livestock problems are regarded with unusual favour.

156. The subjects of the Report (C.A.C. 85) are dealt with under seven heads :—
(1) A census of livestock ; (2) pasturage and feeding ; (3) breeding ; (4) animal diseases ; (5) economic uses of livestock ; (6) markets ; (7) administration of animal health.

157. *Cattle Committee*.—A Cattle Committee consisting of Hon. C. D. Douglas-Jones, C.M.G., Chairman, Hon. J. Mullin, Messrs. T. Bone, H. Everard Turner, J. H. Haly, P. Bacchus, E. Hicken, I. McLean and E. B. Gordon was appointed by His Excellency the Governor in 1930 to advise Government on :—

- (1) The need for better pasturage for the animals on the coastlands, and for those that are brought from the savannahs which may entail the setting aside of certain areas for this purpose ;
- (2) The further study of cattle foods and fodder grasses and feeding grounds and the trail on which the animals are brought down ;
- (3) Steps to be taken for the importation of pedigree stud bulls and extending their services in the out-districts ;
- (4) The extension of the Government Stock Farm ;
- (5) Efforts to be taken to save the calves and improve their condition during the wet season ;
- (6) The introduction of legislation to deal with :—
 - (a) Fencing and cattle trespass ;
 - (b) Precautions against cattle diseases, from which the colony is fortunately free ;
 - (c) Improved system of branding.

The report of the Committee, dated August, 1931, included an appreciation of the great assistance received from their conference with Mr. Montgomery whose visit to the Colony coincided with the sitting of the Committee.

158. *Livestock Returns*.—The Returns of livestock in the Colony for 1931 are as follows :—

Horned Cattle*	...	...	180,621
Horses	...	...	4,914
Asses	...	...	7,300
Mules	...	...	1,578
Sheep	...	...	21,737
Goats	...	...	15,121
Swine	...	...	20,563
Buffaloes	...	...	270

BOTANIC GARDENS AND NURSERIES.

159. Special efforts have been made during the year to increase the attractiveness of the Gardens to visitors. Their general appearance was especially good at the time of the Centenary Celebrations in October.

*Of these 83,826 were in the Hinterland Savannahs.

160. A number of flowering trees and shrubs have been set out at the side of the roads bounding the Front Garden on the north, south and east. The trees and bushes to the south border immediately behind the D'Urban Park Grand Stand were thinned out considerably to allow more breeze to reach the Stand.

161. Considerable repairs were carried out to the roadway in the central avenue, parts of which had become badly worn by increased traffic; four heaps of earth were burnt, and approximately half the avenue was entirely resurfaced.

162. The orchid collection was further added to by exchange, and an unusually large number of these plants was in bloom during July and August.

163. The attention of the Economic Section was mainly occupied with raising of budded orange and grape-fruit plants of standard varieties. 2,236 plants were distributed during the year. The production of grafted mangoes was continued.

164. A number of Oil Palm seedlings of different varieties was raised and basketed, prior to experimental planting in the North West District.

165. The Gardens and Lawns at Government House and the Public Buildings were maintained in order during the year.

SEEDS AND PLANT DISTRIBUTION.

166. The following is a list of the planting material distributed locally by the Department during the year:—

Field and Garden Crops.

Sugar Cane	...	...	400,000 cuttings.
Seed Paddy	...	...	129,290 lbs.*
Black Eye Peas	...	...	756 "
Bengal Beans	...	...	111 "
Pigeon Peas	...	...	32 "
Mung	...	...	40 "
Legumes (miscellaneous)	...	...	440 "
Sweet Potato	...	...	42,600 cuttings.
Onion (seedling)	...	...	24,000 plants.
„ seed	...	...	39 lbs.
Tobacco	...	...	4 "
Broom Corn	...	...	5 "
Banana	...	...	1,447 suckers.
Plantain	...	...	762 "
Papaw	...	...	279 plants.
„ seed	...	...	108 fruit.
Jute	...	...	3 lbs.-
Jerusalem Artichoke	...	...	191 "
Fodders (various)	...	...	15,000 cuttings.

Orchard Crops.

Citrus fruit (budded)	...	...	2,481 plants.
Lime (budded)	...	...	2,123 "
„ (seedling)	...	...	9,742 "
Cacao	...	...	2,257 "
Coffee (Liberian)	...	...	345 "
Fruit (miscellaneous)	...	...	577 "
Mango (grafted)	...	...	166 "
Avocado Pear	...	...	246 "
Sapodilla	...	...	186 "

* Does not include distributions to farmers who entered for the paddy competitions.

SEED AND PLANT EXCHANGE.

167. During the year a number of valuable introductions was made including material of both economic and ornamental plants. Complete lists of the quantities and places of origin are given in the various numbers of the *Agricultural Journal of British Guiana*. I should like specially to mention the assistance given to the Department by Trinidad and Dominica in connection with selected citrus budwood. Among the plants which are worthy of special mention and planting material of which has been received during the year are :—a varied collection of orchids from the Canal Zone, four varieties of sweet potatoes from Barbados, Black Pepper from Kew, onion seed from Egypt and Teneriffe, Citronella from Ceylon and Subterranean Clover from Australia. Contributions from the Department have been sent to :—Barbados; Trinidad; St. Vincent; Dominica; United States Department of Agriculture; Florida; Argentine; Shinka Experiment Station, Japan; Division of Plant Industry, Australia; Sierra Leone; Lower Segama Rubber Estates, British North Borneo; Egypt; Fiji; and the Seychelles.

PUBLICATIONS.

168. The *Agricultural Journal of British Guiana* has been published quarterly and continued to have a moderately wide circulation. The type of subjects dealt with in the articles published have been both technical and popular, and this necessarily must be the case as a publication such as the *Agricultural Journal* is intended to aid in the distribution of information to local agriculturists, to serve as a record—easy of reference—of work undertaken, to convey to other agricultural workers an account of the agricultural problems investigated and the progress made. The *Journal* served as a valuable connection with other institutions whose publications were received in exchange and from which our own workers derived much help. Unfortunately, Government found it necessary, as an economic measure, to suspend publication of the *Agricultural Journal* and there appeared in the last issue of the year a notice to the effect that after that number there would be “no appearance until further notice.”

169. Many of the more popular contributions were reprinted in leaflet form for free distribution. Among those distributed in this way were :—“The Rice Caterpillar”; “Fencing and its significance to local livestock problems”; “Tobacco Cultivation in British Guiana”; “Egg Plant Stem-Borers”; “Plant Diseases”; “Cultivation of Orchids”; “Hides”; “Cover Crops and Green Manures”; “Progress and Possibilities of pure-bred poultry in British Guiana”; “Yams.” In addition, “Agricultural Notes compiled by the Department of Agriculture” have appeared periodically in the local press, which has always been ready and willing to co-operate. Only subjects of a popular nature and likely to be of local interest are thus dealt with and the following are examples :—“Peas and Beans,” “Insects of Stored Paddy in Rice,” “Grape Vine Culture,” “A Local Bee Industry,” “Agricultural Competitions.”

170. The Director has made contributions to the Chamber of Commerce and Mr. R. R. Follett-Smith (in collaboration with Professor F. Hardy) published in the *Journal of Agricultural Science*, Vol. XXI., Part 4, October, 1931, an article entitled “Studies in Tropical ^{SEEDS} Cereals.” The illustrated brochure, *Buy Demerara Rice*, published by the Department in 1930, was translated into Spanish.

AGRICULTURAL LEGISLATION.

171. On February 1, 1931, there came into force the Rice (Export Grading) Regulations, 1931, as an amendment to the Rice (Export Grading) Regulations, 1930.

CONFERENCE OF COLONIAL DIRECTORS OF AGRICULTURE.

172. An event of outstanding importance, which took place during the year, was the Conference of Colonial Directors of Agriculture held at the Colonial Office in July, 1931. This Conference, which was opened by the Secretary of State, was the outcome of a recommendation made at the Second West African Agricultural Conference held in the Gold Coast in 1929, that Colonial Directors of Agriculture should meet at regular intervals under the chairmanship of the Agricultural Adviser to the Secretary of State. Mr. F. A. Stockdale presided in that capacity and there were delegates from practically all the Colonies, British Guiana being represented by its Director of Agriculture. In addition, arrangements were made for authorities in the United Kingdom, interested in certain subjects, to attend meetings of the Conference. In this way the delegates had the privilege of listening to Directors or representatives of the Royal Botanic Gardens, Kew, Imperial Agricultural Bureaux, Imperial Institute of Entomology, Imperial Institute of Mycology, Cambridge University, Rothamsted Experiment Station and others.

173. The more important topics considered were as follows:—Imperial Agricultural Bureaux; Training of Agricultural Officers; Training of Officers for the Subordinate Services; Agricultural Education; Functions of local Advisory Agricultural Bodies; District Registers; Produce Inspection; Co-operation; Control of Crop Pests and Diseases; Methods of Field Experimentation; Records of Experiment Stations; Animal Husbandry. The details of the Proceedings, with Resolutions, have since been published.

174. I should like to stress that it was the unanimous opinion of those who attended this Conference that every endeavour should be made, as far as possible during the present economic depression, to maintain the various Agricultural Departments in a state of efficiency, realising that it was through the work and efforts of these Departments that recovery would be effected. It is hardly necessary to point out how valuable such a Conference is in enabling Directors to meet each other and discuss the varied problems which confront agricultural administrators in the tropical Departments of Agriculture.

GENERAL REMARKS.

175. Agricultural development is slow and a review of the agricultural progress made within short periods of time is a particularly unhappy subject for dramatic effect. In the prosecution of agricultural investigation there is the first phase in which there is "something attempted" followed by the second phase in which there is "something done." There invariably elapses a period, frequently a long period, between the two phases. In this report there have been mentioned many lines of endeavour, the value of which can be appreciated only in the course of time, but during the period under review there has also been accomplished much which is more immediate in effect and some of which is already exerting an influence on local agricultural practices and outlook.

176. In the sugar industry there are now laid down variety trials distributed throughout the cane producing areas of the Colony; clear indications are given by certain of these experiments, and the importance attached to this work by the estates may be inferred from the fact that in 1931 the sugar planters procured 400,000 cane-cuttings from the sugar station compared with 138,000 in 1929; additionally, there are corresponding manurial trials—carried out in collaboration with soil surveys in certain cases—that are disclosing definite information on the most economic manurial practices to be followed not only on estates but on different fields on estates. In the rice industry, a Colony wide scheme for the regular distribution of selected seed paddy in adequate quantity has been brought into operation. The rapid improvement in quality of Demerara rice bears testimony to the value of this step. Grading of all rice for export is now an accomplished fact and compulsory blending is envisaged.

177. In the minor industries there is a marked increase in the local output of two important articles of diet—sweet potatoes and black eye-peas. It is, therefore, felt that the Department's demonstration plots with these crops at the district stations have not been without effect, nor has the distribution of planting material of tried and selected varieties of these and other minor crops (*e.g.*, onions) failed to stimulate activity in the minor agricultural industries as a whole.

178. In this country, as in most other farming communities comprised of mixed races, it has not been easy to create a bias for agricultural co-operation. Attention is therefore drawn, with a considerable amount of satisfaction, to recent progress in this direction which is indicated by the formation of bodies calculated to promote and encourage co-operation among the agriculturists of the Colony. Those to which special reference may be made are The Cattle Owners' Association, The Poultry Association, The British Guiana Producers' Association, and the British Guiana Workers' League, while plans were in hand at the end of the year for the formation of a Beekeepers' Association.

179. The efforts made by the Department to encourage the formation of Juvenile Agricultural Clubs are intended to aid in this co-operative movement. To organise these clubs is not an easy task and it has been found very difficult to sustain the interest of the young members in the activities of the clubs. It is considered that the formation of young people's agricultural clubs will only meet with success locally when our elementary school teachers possess sufficient training in the rudiments of agriculture to ensure a distinct agricultural bias being imparted to the teaching in their schools.

180. Although production was maintained and even increased in many cases, the year under review has been one of the most critical in the history of the Colony. Prices for most agricultural products continued on a downward trend. It is true, producers derived some little compensation in the shape of reduced production costs, nevertheless, the heaviest burden that depression puts on agriculture is the difficulty in meeting fixed charges. Taxes, rents, interest charges and similar liabilities absorb the greater portion (if not all, in some cases) of the revenue derived from output. The cry is often heard that the agriculturist in such times as these must shift over to other crops. If even there were profitable and suitable crops to which to shift, the local agriculturist could hardly contemplate a change from sugar, when apart from field difficulties there are the factory and other capital commitments to be equally adjusted. Again, with rice, a certain layout is necessary and shifting to another crop is not easy; indeed, to do so would be to make the whole position much worse than it is. The fact is, on the whole, a long range view is necessary, and must be adopted in preference to temporary shifts.

It may be said that the sugar planters are adopting this attitude, and endeavouring to meet declining prices by such economies as may be permissible without jeopardising the future of their industry and the capital invested. In this, they are being aided by the preference both in the United Kingdom and Canada, and the favourable difference in Canadian Exchange. It is not easy, however, to continue on this low level of maintenance, since a margin for further cuts no longer exists, and a wrong decision, unwittingly made, or failure to turn, at the right moment, some disadvantage into a possible advantage, may mean all the difference in averting disaster. The sugar producers in this Colony are to be commended for their insight and ability in the struggle to maintain an industry whose failure would spell ruin for the entire Colony. Further, the Department's efforts to collaborate with the industry have been met with vigorous and responsive co-operation.

181. In regard to rice, although prices have declined, the future of the industry on an export basis now seems fully assured, and several factors have contributed. First, recognition that rice is a crop eminently suited to local conditions; secondly,

the intensive educational and propaganda work undertaken by the Department not only among local cultivators, millers and exporters, but in the neighbouring and overseas markets; thirdly, the establishment of an organised seed supply to ensure that only the best quality and heaviest yielding types of rice are produced; fourthly, the introduction of grading, with the co-operation of the Rice Committee of the Chamber of Commerce, under Government auspices; fifthly, the increasing number of reputable firms responsible for the marketing of the product. With the efforts being put forward to retain and increase Caribbean markets against Indian competition, there is every indication that the Colony will be able to market all the rice which can be produced for some time to come. Undoubtedly, there are still many drawbacks to the greater expansion of this industry, and these have been dealt with in that portion of the Report devoted to the subject.

182. Administration duties continue to be heavy, and it is difficult to cope with the increasing volume of work, the nature of which invariably requires careful study and prompt attention. This applies not only to matters affecting departmental policy, preparation of memoranda and reports on various schemes for colonial development but also in regard to general correspondence, committee meetings, interviews, Executive and Legislative Council work. Approximately, 5,000 items of outgoing correspondence have been dealt with and 500 departmental files opened.

183. The need for improved Laboratory and office accommodation continues to be keenly felt, and the work of the Department is likely to be severely handicapped unless attention is given to these urgent requirements in the very near future.

184. The services and advice of the Director and staff were utilised to the fullest extent by local and overseas commercial and scientific visitors during 1931. Special mention should be made of the visit during the early part of the year of the Financial Commissioners who made a careful investigation of the Department's work in relation to its expenditure.

185. In conclusion, I should like to express my great appreciation of the loyal help given by the staff during the year. The thanks of the Department are due also to the Agricultural and mercantile community for assistance freely rendered, and to the local newspapers for their courtesy in distributing agricultural information.

J. SYDNEY DASH,
Director of Agriculture.

June 25, 1932.

REPORT ON THE BUSH LOT LAND SETTLEMENT, ESSEQUEBO, FOR THE YEAR 1931.

SIR,

I have the honour to submit my report on the Bush Lot Land Settlement, Essequibo, for the year ending December 31, 1931.

2. At the close of the last Autumn crop (December, 1930) the settlers who had proved to be unsuitable and were unable to carry out the efficient cultivation of their paddy lots and gardens, were given notice to leave and their places filled by tenants from the Anna Regina estates. The vacant lots were in great demand by these, which was quite a contrast to the previous year, when not a single settler came from the adjacent Anna Regina Estates—probably due to a desire not to reside in the Settlement which is located on the sand reef some distance from the public road, near which they have been living for years, even though in rather squalid conditions. There are now 81 families in residence, 53 being old settlers and 28 new settlers.

3. The total area of paddy land under cultivation is 243 acres; 12 acres of the original area had to be abandoned for this purpose owing to its being too high for efficient irrigation.

4. The health of the settlers has been good during the period under review, and fewer cases of a serious nature have been recorded; only three deaths occurring during the year—two males and one female—one of the males dying as the result of an accident.

5. The Government Medical Officer has paid regular visits to the Settlement and following on His Excellency the Governor's visit in January, 1931, a vacant house in the Settlement was allocated for use as a dispensary. Recently, however, in view of the Medical Officer's transfer to Suddie, the dispensary has been closed down and the sick settlers are now treated at the Government dispensary which has been opened at Anna Regina.

6. The question of a pure drinking water supply has been investigated during the year and estimates submitted.

7. *Crops.*—During the early part of the year, owing to the dry weather conditions, and consequent lack of irrigation water for planting padi, the settlers gave special attention to the cultivation of their gardens and the preparation of provision lands. Seeds were obtained for them and a demonstration garden (with nurseries) was laid out on a vacant bed in the Settlement. General instructions and demonstrations in gardening were given on this plot and seedlings distributed. Some excellent crops of onions and other vegetables were raised and these were sold in the neighbouring markets. The produce provided a fair amount of revenue at a most critical time, as it was impossible owing to the shortage of water to plant up a short paddy crop. The supply of vegetables in the district outside the Settlement during the dry weather was very scarce and market traders from along the coast visited the Settlement during this period to obtain supplies. With the commencement of the work on paddy in May last, less attention was paid to garden cultivation. In addition, settlers were now finding it difficult to dispose of their produce as abundant supplies of vegetables were becoming available in the District. Sufficient, however, was still grown for their own needs.

8. The period December to March is the best season for garden cultivation in this district, when the best crops are produced. The progress made with garden work during the year was a great improvement over last year, and can be attributed

principally to the intensive instruction and supervision which had been given. The model demonstration garden has served a very useful purpose in the practical demonstration of manuring, making nursery beds, etc., and general garden management. Particular stress was laid on the importance and need of farmyard manure in garden cultivation, and this fact is beginning to be appreciated by the settlers. They, however, still prefer paddy cultivation to gardening and, generally speaking, prior to their arrival at the Settlement, had very little knowledge of the cultivation of crops other than paddy. Their mentality is such that they would make good gardeners or good paddy cultivators but are unable to divide their attention satisfactorily to the cultivation of more than one crop at a time. This phase has to be faced but with continued instruction and encouragement it is hoped to overcome this difficulty.

9. An area of jungle at the back of the Bush Lot Settlement was cleared for the cultivation of provision crops during the year, and each cultivator allotted half an acre. Cutting the bush and clearing the ground was commenced in the dry season (February to March). Difficulty was experienced at first in interesting the farmers in this work especially as the majority had no experience of provision cultivation. Eventually, the scrub bush was cleared and burnt and the allotments planted up under the direct supervision of the agricultural officers, immediately before the rainy season commenced.

9. Plantains, bananas and cassava were the principal crops planted but other minor crops such as corn, eddoes, tannias, yams and black-eye peas were also introduced. The value of black-eye peas as a weed smother crop, in addition to its value as a money crop, was successfully demonstrated. With the commencement of the rains, sweet potato cuttings were also "set" and efforts were made at a later date to establish some Giant Millet Guinea Corn. The planting of the latter crop, however, did not receive the attention it deserved. As excellent flour can be produced from this cereal and although its value was emphasised, it was evident that the settlers preferred to purchase their requirements rather than manufacture it from their own supplies. Thus, the value of additional crops other than paddy can only be gradually realised, although some anxiety is sometimes felt since the local market is often glutted with ground provisions and plantains. A census of all marketable produce has recently been made (more especially of plantains) and particulars forwarded to the British Guiana Producers' Association with the hope that they will be able to find suitable markets for these commodities.

10. With the commencement of the rains in May, work was commenced on the paddy plots, and experiments were carried out with "dry" ploughing. On the lighter soils this was most successful but it was found impracticable on the stiff heavy clays. Nurseries were set as soon as sufficient water was obtainable, with pure line paddy grown at the Henrietta Seed Supply Station. At this period, considerable trouble was experienced with Vicissi ducks, which came in flocks from the Savannahs and completely wiped out the nurseries. It was necessary to re-sow as many as three times before seedlings were eventually obtained.

11. This caused a serious delay in planting in the field, and was most disappointing especially as every effort was being made to get all the planting finished early in the season. Again, when the seedlings were three to four weeks old, trouble was experienced with caterpillars, which appeared in large quantities in every nursery. Flooding was resorted to but considerable damage was done before they could be eliminated. After these difficulties were overcome, planting was eventually completed in July—two weeks later than anticipated.

12. *Rice Harvest.*—The crop was harvested in October and the yields obtained were generally satisfactory, the total number of bags harvested being 4,900 or an average of just over 20 bags per acre; the highest yields from individual three acre lots being 82 bags and the lowest 43.

13. Improved irrigation in one section of the old reclaimed land was responsible for increased yields in that area which was sufficiently irrigated for the first time.

14. Expenses in connection with harvesting are very high and the price of labour does not fluctuate with the price of paddy. This is due to the fact that the only available labour for harvest, particularly threshing operations, is the "Blacks." These people are not paddy cultivators and since the paddy farmer is dependent on them for labour during harvest, high wages are demanded. Particularly is this the case when whether conditions are unsettled, as happened this year, when the already very high local rates of pay have to be increased if the paddy is to be expeditiously harvested. This factor, which was very marked at the Settlement this year, is militating against the increase of paddy cultivation throughout the district as farmers, after paying such heavy harvesting expenses are left with very little profit.

15. To make paddy cultivation a paying proposition on an attractive basis, mechanical aid during the harvesting season is essential. Labour rates paid at the harvesting season this year at Bush Lot were as follows :—

Reaping	...	...	52 cents per quarter.
Threshing	...	...	\$ 1 32 " "

making a total of \$1.84 per quarter. These costs include transportation but do not allow for hand winnowing, which, when included, will bring the total cost to \$2 per quarter acre. At 5 bags to the "quarter" the cost per bag will be 40 cents for harvesting alone, which is practically one-fourth the value of a bag of paddy. With the arrival, through the aid of the Colonial Development Fund, of the demonstration threshing and winnowing machines at Anna Regina, accurate comparative costs will be obtained. Mechanical aid in winnowing alone will speed up the harvest considerably, another factor of great importance when the weather is uncertain.

16. *Competitions.*—The following competitions were held during the year:

BUSH LOT LAND SETTLEMENT—PADDY COMPETITION.

For the best block of paddy grown by a settler at Bush Lot. The conditions of entry for this competition were as follows :—

- (a) Entrant to be a settler under the Bush Lot Land Settlement Scheme.
- (b) Entrant to be cultivating the whole of his paddy lot, *i.e.*, three acres.
- (c) Entrant to have his nurseries set by the end of May. All the settlers entered for this competition. It was gratifying to note that following on instructions given during the competition held last year, all the settlers, including the new farmers, prepared large nurseries leaving plenty of space for the seed when sown, which would produce strong plants. There is still a tendency, however, to sow more seed than is necessary. It was emphasised that this is a wasteful practice and that if plenty of space is given in the nursery, stronger plants and better yields will be the result. The seed was sown at the rate of 7 to 8 lb. per square rod. All seed germinated prior to sowing according to instructions. The nursery plants were set in good time and made a promising start despite the lateness of the rains and the consequent lack of irrigation water.

17. Unfortunately, due to the persistent attacks of Vicissi ducks, a setback occurred. These came from the Tapacooma savannahs with the commencement of the heavy rains. Nurseries were completely wiped out by these birds and acres of seedlings lost. Everything was done to combat this pest. Shelters were erected by the farmers who sat up all night to protect their nurseries. Scares, traps and guns were used but with little result. Nurseries had to be resown in many cases as many as three times. It was estimated that on the Bush Lot Land

Settlement section alone, \$60 worth of damage was done in one night. The birds later attacked the grown plants laying nurseries quite flat.

18. It was found that the most successful way of keeping the ducks off newly set nurseries was to dry them off as completely as possible every night. Water in the nursery attracted the birds and as they came in flocks they were able to clean up a set of nurseries very quickly.

19. The great losses sustained through the ravages of this pest also caused transplanting to be delayed by at least two weeks. Heavy rain continued, and the ducks gradually migrated elsewhere. Later a bad attack of caterpillars broke out. These also did much damage. Nurseries were flooded as high as possible and the plants "brushed" to remove the pest.

20. Such two serious setbacks did not encourage the cultivators, who at that time were inclined to give up all idea of any competition as long as they were able to get their paddy lots planted. Planting was eventually completed by the second and third weeks in July, three weeks later than anticipated. Instructions were then given in the matter of roguing, *i.e.*, elimination of all volunteer plants. This was well carried out on the whole with the first and second weedings. Here again it was gratifying to note that the settlers remembered instructions which had been given to them on this point last year.

21. Instruction was also given in the roguing of paddy when it had come into ear. This practice is not followed quite so well. It is a somewhat tedious operation and no cultivator appreciated its full significance. This was later brought home to them, however, when the paddy was being purchased on behalf of a Georgetown firm. Any paddy not pure in sample was rejected and sold to an outside miller at a greatly reduced price. One or two examples of this kind which affect the financial value of the crop, aid tremendously in improving cultural methods. Following on this point, it may be mentioned here, that a greater number of rice millers are now buying on quality of paddy brought to their mill. One miller this year gave three different prices based on quality.

22. The yields of paddy were good, the total amount harvested from the 243 acres being 4,900 bags. This works out at a little over 20 bags per acre average, which is satisfactory when taken over a whole estate section having all classes of land, and bearing in mind the setbacks previously mentioned. The total yield from this section alone, growing pure line seed, exceeded that reaped from other estates having a much larger acreage. The quantity also was far superior. The highest yield reaped from three acres was 82 bags of 155 lbs. gross. The final result was as follows :—

1st prize	...	(\$10 00)—Woozier.
2nd "	...	(7 50)—Nepaul.
3rd "	...	(5 00)—Sahadutt.
4th "	...	(2 50)—Rambaran.

BUSH LOT SETTLEMENT—GARDEN COMPETITION.

23. For the best miscellaneous garden cultivated by a settler at Bush Lot. The conditions of entry governing this competition were as follows :—

- (1) The garden entered to be on the Land Settlement house lots ;
- (2) General location of the coconut and other trees to conform with the Agricultural Superintendent's plan ;
- (3) Vegetable and flower gardens to be separate ;
- (4) Cassava and plantain cultivations not to be eligible ;
- (5) Notice to be given by the Agricultural Superintendent as to the closing of entries.

Points to be awarded for :—

- (i) General appearance of the house lot, including flower and vegetable cultivations, coconut seedlings, citrus and other fruit trees.
- (ii) Vegetables :—
 - (a) General appearance, irrespective of the number of varieties grown, cleanliness of beds, etc.
 - (b) Arrangement of the beds.
 - (c) Cultivation, attention to manuring tilth, etc.
- (iii) Flower Garden :—
 - (a) Arrangement and tidiness of the beds ;
 - (b) Variety of flowers.

24. Periodical talks were held by officers and demonstrations given with special reference to the points enumerated above. Advice given was general and not confined to any particular competitor. Great improvement was shown over the previous season when most of the settlers were new to garden work.

25. Special attention was paid to this work during the early part of the year and a demonstration garden—seed and plant material nursery—being instituted. This proved of great benefit to the settlers, who received instruction in the raising of seed in the nurseries and the planting and management of garden plots. The nursery also acted as a medium through which seed and plants were distributed. The response to these efforts was very favourable and some excellent crops were raised, particularly of onions, boulanger, eschalots, tomato and spinnach.

26. The gardens were especially useful and profitable during the drought period in the early part of the year when fresh vegetables in the district were very scarce. This produce was greatly appreciated, being at one time practically the only source of supply. The settlers were able to dispose of it in the villages from Queenstown to Hampton Court and a regular custom was established by them. Supplies of vegetables were also disposed of in the local market. Later, market traders even visited the settlement to purchase supplies. Settlers were advised against selling to these people as better prices could be realised by retailing the produce themselves.

27. A supply of vegetable seed has been ordered on the settlers' behalf and distribution has lately taken place and in this way progress should be well maintained during the coming year. The results of this competition were as follows :—

1st prize	...	(\$ 8 00)—Leecharran.
2nd „	...	(4 50)—Sunderlall.
3rd „	...	(2 50)—Prayag.

28. It is gratifying to note that as a result of these competitions and the instructions given at intervals, there is a definite improvement in the settlers' cultivations. It is particularly interesting to note that “the improved methods” which were advised last year were carried out this year without further instruction. Thus, in this way, it is hoped to improve the standard of cultivation each year.

GENERAL REMARKS.

29. His Excellency the Governor visited the Settlement in February, accompanied by Sir Wilfred Beveridge and the Director of Agriculture. His Excellency made another visit in July accompanied by the acting Director. The Colonial Secretary visited the Settlement in May.

30. Satisfactory progress has been maintained during the year and all the cultivators have worked well. Happily, therefore, it will not be necessary to remove any this year as was the case in 1930. Improvements have been carried out on drainage and irrigation, and the paddy plots—81 in number—are all now efficiently irrigated and drained. The settlers, with the exception of 12 (owing a total of

\$415.61) have paid off all cash advances and next year when two crops of paddy will be reaped they should be in a sound financial position. The small balances represent the cost of ploughing steers.

31. Many of the settlers are capable of cultivating more than three acres of paddy land and these will be given additional land at Anna Regina under the extension scheme as soon as completed. A total of 4,425 bags of paddy was marketed for the settlers on a co-operative basis and a better price obtained than was being paid on the coast, viz., \$1.75 per bag plus a new bag. A sum of \$7,743.75 was thus distributed to the settlers, enabling them to pay rents and cash advances in full in the majority of cases. In addition to this transaction on behalf of the Bush Lot settlers, the Anna Regina tenants received \$3,600 in cash for the paddy marketed for them.

32. While this report deals almost entirely with the section of the Anna Regina estates known as Bush Lot, on which the experimental settlement is situated, the Department Agriculture has, from the very beginning, been charged with the supervision and maintenance of the whole block of properties. Extension of cultivation is now being made possible through the aid of Unemployment Relief Funds which has given a considerable number employment in breaking down and preparing the old cane beds for rice cultivation.

33. Further, from July 1, 1931, La Belle Alliance, one of the original Anna Regina sections, has been brought back into the block, on instructions from Government, with an additional liability of \$24,000. This property was acquired in consequence of the default of the mortgagee to Government on a mortgage on this and other properties purchased from Essequibo Land Settlement, Ltd., in liquidation of which Government was the principal shareholder. The mortgage stood at \$34,000. Of this sum \$9,000 is still recoverable from the mortgagee on the security of other properties.

34. Thus, the activities in connection with the development of these estates have so increased that the responsibility of maintenance and general management require early re-adjustment and the time would appear ripe for the control of these properties to be directed in accordance with paragraph 18 of the late Sir Gordon Guggisberg's Memorandum No. 4 dated February 6, 1929, dealing with the future administration of this settlement. This position is rightly acknowledged by Government especially as the regular district agricultural activities call for daily contact with cultivators by the District Agricultural Officers.

35. Progress to date has been steady and definite and at the end of 1932, the majority of the settlers should be in a comparatively sound financial position, while it may be stated, with confidence, that the economic data so far collected will be of the utmost importance in the development of similar areas on the coastal belt.

36. For convenience, statements of expenditure and revenue for the three years 1929, 1930 and 1931 are hereby attached. As will be seen, the total capital value of these properties now stands at \$161,358.35 less \$10,203.64 revenue received, equivalent to \$151,154.71. It should be observed that the total current expenditure amounting to \$23,937.72 as set out in the financial statement has not been included in the above figure since this is more than offset by the value of—

- (i) Houses and buildings in Block "A," taken over for Government use ;
- (ii) Remainder of machinery and scrap metal now being disposed of ;
- (iii) Other realisable assets.

37. With the areas being taken up, a total of 2,300 acres will be rendered available for cultivation 1,237 acres for rice-growing, 424 acres for foodstuffs and

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vegetable crops and 677 acres for cattle-grazing. Calculated on the present working basis, when these lands are fully leased, a minimum annual net income of \$6,000 should be received—equivalent to approximately a 4 per cent. return on capital invested.

I have the honour to be,

Sir,

Your obedient Servant,

J. SYDNEY DASH,
Chief Colonization Officer.

Department of Agriculture,
British Guiana,
February 25, 1932.

**EXPENDITURE FROM THE COLONIZATION FUND FOR THE YEARS 1929,
1930 AND 1931.**

	1929.	1930.	1931.
CAPITAL EXPENDITURE.			
PURCHASE PRICE OF PROPERTIES—			
Plantations Anna Regina and Richmond	\$ 75,000 00	...	...
Plantation Bush Lot	11,850 00	...	...
Plantation La Belle Alliance	...	...	\$ 24,000 00
	\$ 86,850 00	...	\$ 24,000 00
SETTLEMENT SCHEME—			
Bush Lot Land Settlement Scheme—(Development of land and construction of 85 houses)	\$ 34,951 41	\$ 9,216 85	...
SUNDRY WORKS—			
Empoldering areas—factory and estate houses, Anna Regina	\$ 310 12	889 06	...
Adapting building, Anna Regina, for use as a Rice Mill	...	...	1,091 42
Check Sluices at Richmond and Bush Lot	...	2,158 00	...
New Intake Koker at Lamaha Canal	...	243 30	214 31
Repairs to Kokers and other Works	...	...	1,433 88
	\$ 310 12	\$ 3,290 36	\$ 2,739 61
Total Capital Expenditure	\$ 122,111 53	\$ 12,507 21	\$ 26,739 61
CURRENT EXPENSES.			
ADMINISTRATION—			
Remuneration to Chief Colonization Officer	\$ 600 00	\$ 400 00	...
" to Accountant	240 00	160 00	...
Salary—Steno-Typist	330 00	360 00	360 00
Salary and Travelling to Chemist-Ecologist	2,730 16	...	...
	\$ 3,900 16	\$ 920 00	\$ 360 08
SETTLEMENT SCHEME—			
Bush Lot Land Settlement—upkeep of	\$...	\$ 1,172 59	\$ 1,202 50
ANNA REGINA cum annexis—			
Staff at Anna Regina	\$ 679 52	\$ 2,087 44	\$ 2,269 74
Maintenance and Contingencies	1,440 17	4,016 03	2,453 10
Drainage and Irrigation Assessment	...	689 08	394 76
Reconditioning land at La Belle Alliance	...	...	540 03
	\$ 2,119 69	\$ 6,792 55	\$ 5,657 63
Miscellaneous Expenditure	\$ 976 01	\$ 681 61	\$ 154 98
Total Current Expenses	\$ 6,995 86	\$ 9,566 75	\$ 7,375 11
Gross Total	\$ 129,107 39	\$ 22,073 96	\$ 34,114 72

**REVENUE CREDITED TO COLONIZATION FUND FROM ANNA REGINA AND
BUSH LOT DURING 1929, 1930 AND 1931.**

Classification.	1929.	1930.	1931.
Bush Lot and Henrietta land rents	\$ 629 07	\$...	\$...
BUSH LOT SETTLEMENT SCHEME—			
Bush Lot rents	\$...	\$ 714 75	\$ 1,314 00
Interest on Settlers' Advances	...	...	53 78
ANNA REGINA ESTATES—			
General Revenue	\$ 191 70	\$ 634 02	\$ 562 29
Rice bed rents	997 86	1,578 90	1,879 17
Pasture and Provision Farm Rents	69 80	461 19	590 96
MISCELLANEOUS—			
Rent of Rest House at Maburuma	\$...	\$ 60 00	\$ 60
Total Revenue	\$ 1,888 43	\$ 3,448 86	\$ 4,469 20
SALE OF ASSETS CREDITED TO PURCHASE PRICE OF PLN. ANNA REGINA.			
ANNA REGINA—			
Sale of Livestock	\$ 1,584 00	\$...	\$...
Sale of Land	30 00	...	...
Sale of Machinery and Scrap	2,812 95	4,198 29	1,578 40
	\$ 4,426 95	\$ 4,198 29	\$ 1,578 40

